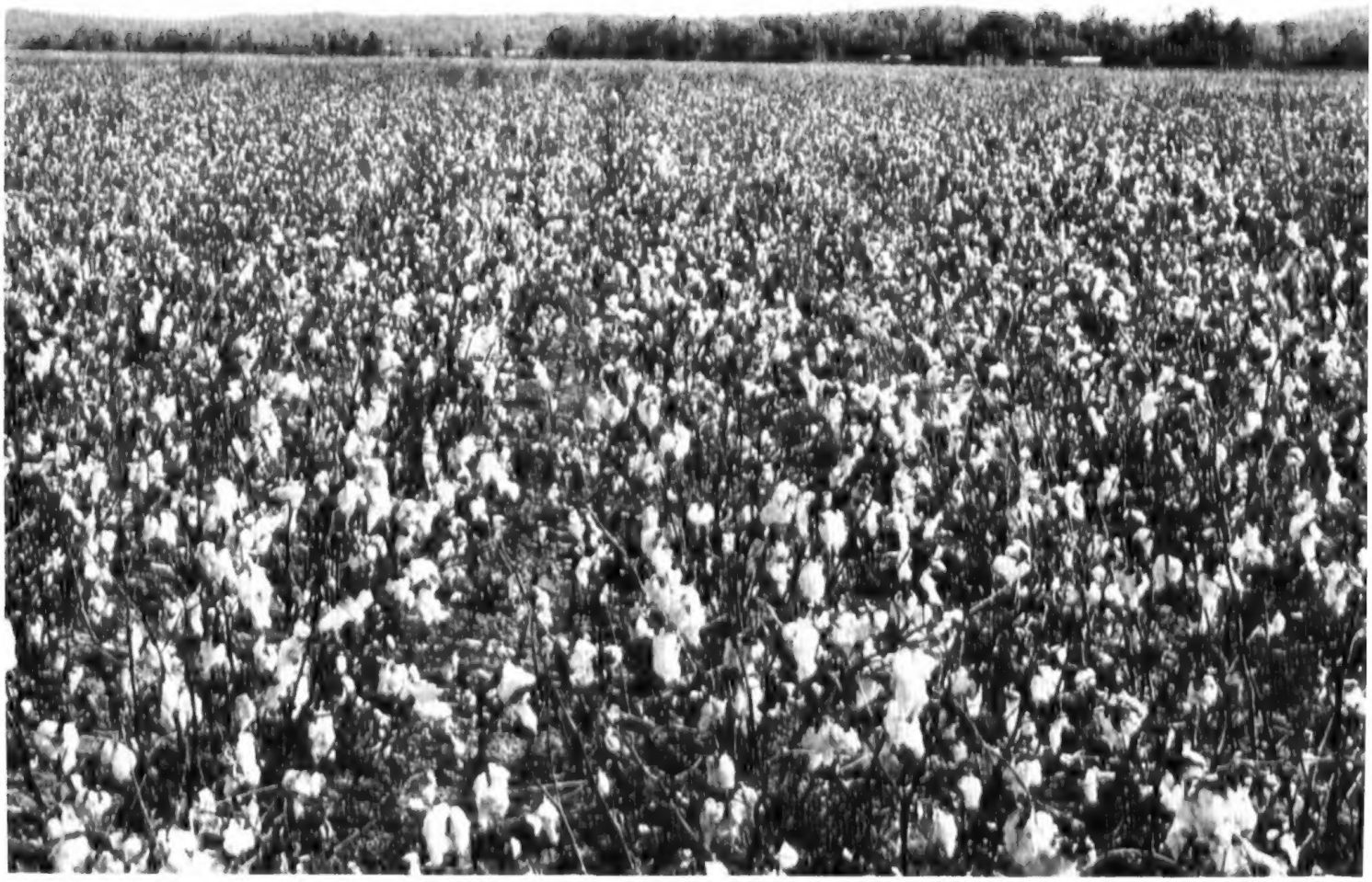
United States Department of Agriculture

Soil Conservation Service

In cooperation with Mississippi Agricultural and Forestry Experiment Station

Soil Survey of Carroll County, Mississippi



How To Use This Soil Survey

General Soil Map

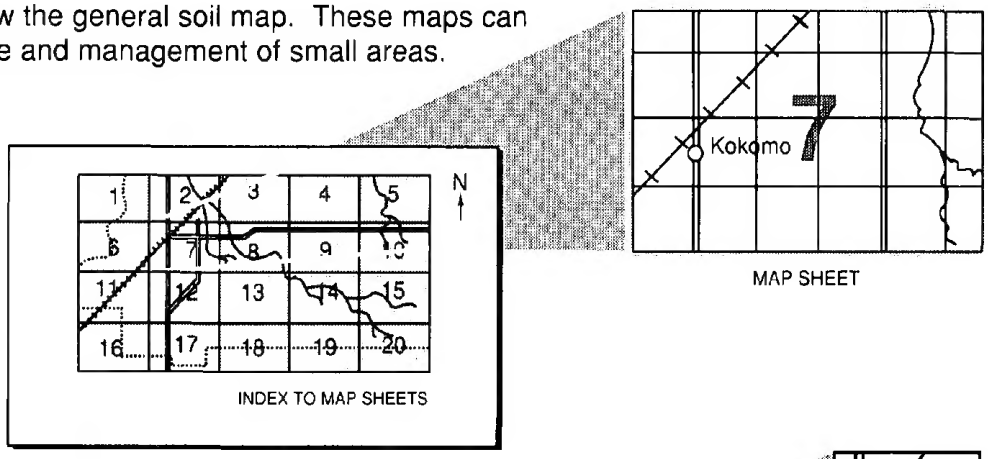
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

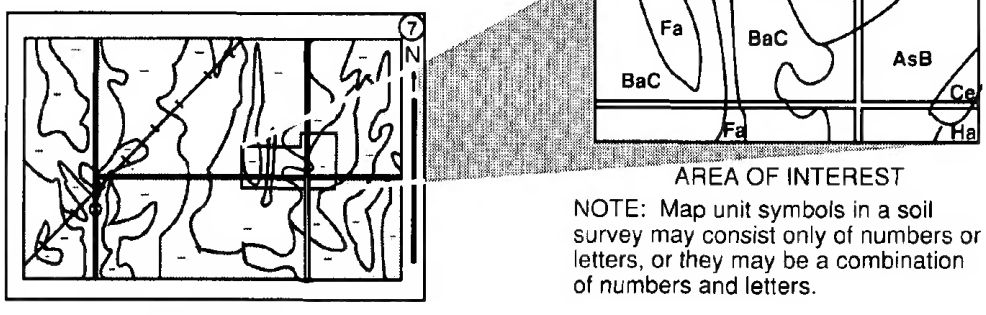
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



MAP SHEET

AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1985. Soil names and descriptions were approved in 1985. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1985. This soil survey was made cooperatively by the Soil Conservation Service and the Mississippi Agricultural and Forestry Experiment Station. It is part of the technical assistance furnished to the Carroll County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Crops, such as this cotton, are important agricultural sources of income in Carroll County.

Contents

Soil Series

Issued March 1990

Index to Map Units

Summary of Tables

Foreword

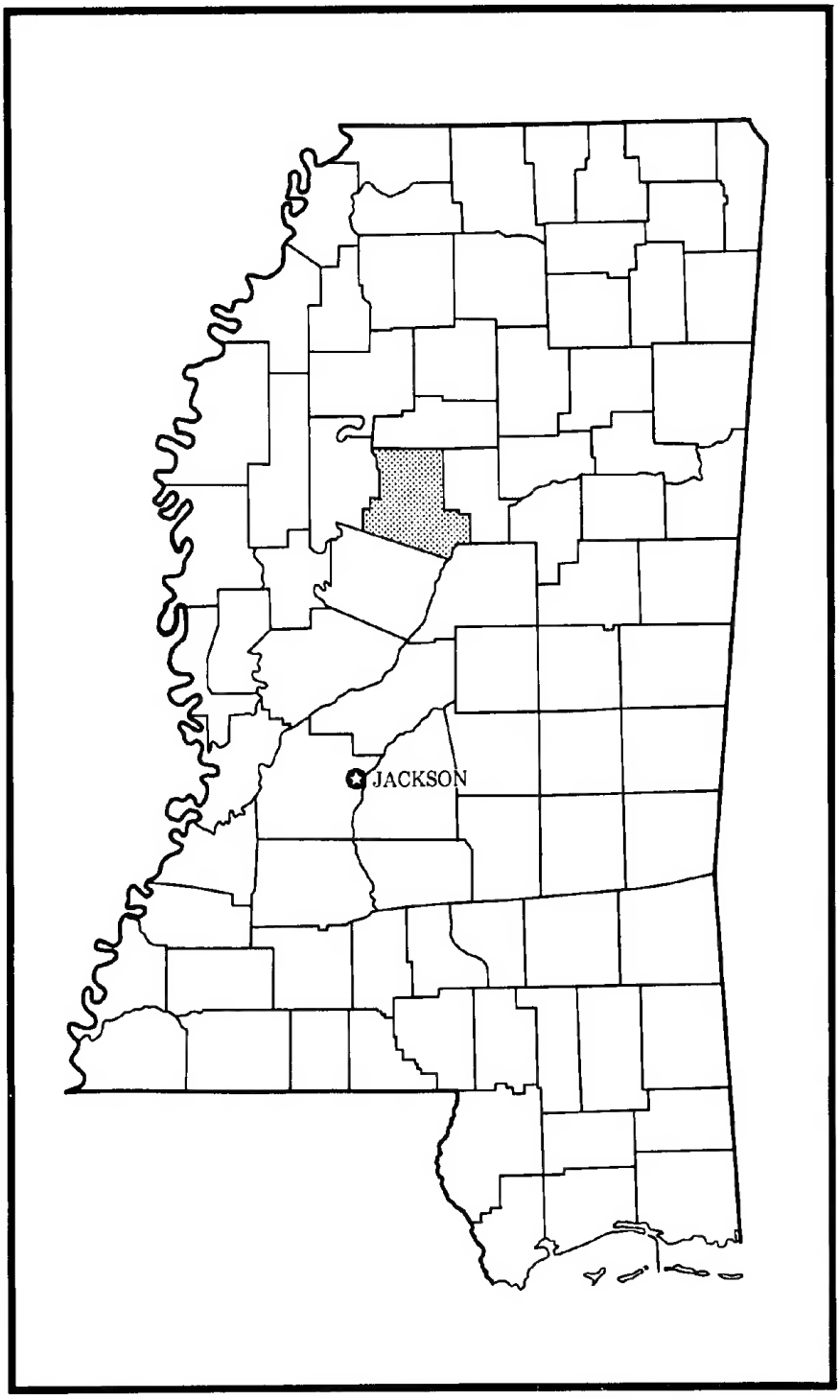
This soil survey contains information that can be used in land-planning programs in Carroll County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

L. Pete Heard
State Conservationist
Soil Conservation Service



Location of Carroll County in Mississippi.

Soil Survey of Carroll County, Mississippi

By Jerry S. Huddleston, Soil Conservation Service

Soils surveyed by Jerry S. Huddleston, Jimmy G. Ford, and Huel L. Neal, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
In cooperation with the
Mississippi Agricultural and Forestry Experiment Station

CARROLL COUNTY is in the west-central part of Mississippi. Carrollton and Vaiden are the county seats. According to the 1980 census, Carroll County had a population of 9,776. The total area of the county is 408,320 acres, or about 638 square miles.

The county is bounded on the south by Holmes County, on the west by Leflore County, on the north by Grenada County, and on the east by Montgomery and Attala Counties. Crops, mainly soybeans and cotton, and livestock are important agricultural sources of income. Forest land covers about 50 percent of the county, and cropland and pastureland cover about 44 percent. In 1982, farms in Carroll County averaged 384 acres *(24)*.

Soil scientists have determined that about 47 different soils are in the county. The soils range widely in texture, natural drainage, slope, and other characteristics.

Descriptions, names, and delineations of soils in this county do not fully agree with those on soil maps for adjacent counties. Differences are the result of better knowledge of soils, modifications in series concepts, intensity of mapping, or the extent of soils in the survey.

General Nature of the County

In this section, general information about Carroll County is given. The information includes climate, history and development, relief and drainage, physiography, natural resources, and water resources.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Greenwood, Mississippi, in the period 1951 to 1981. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 46 degrees F, and the average daily minimum temperature is 36 degrees. The lowest temperature on record, which occurred at Greenwood on February 3, 1951, is -4 degrees. In summer the average temperature is 81 degrees, and the average daily maximum temperature is 91 degrees. The highest recorded temperature, which occurred at Greenwood on July 16, 1980, is 105 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 53 inches. Of this, 24 inches, or 45 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 19 inches. The heaviest

1-day rainfall during the period of record was 8.07 inches at Greenwood on September 20, 1958. Thunderstorms occur on about 64 days each year, and most occur in summer.

The average seasonal snowfall is 2 inches. The greatest snow depth at any one time during the period of record was 8 inches. On the average, 1 day each year has at least 1 inch of snow on the ground.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 90 percent. The sun shines 65 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 9 miles per hour, in spring.

Severe local storms, including tornadoes, strike occasionally in or near the area. The storms are short and cause variable and spotty damage. Every few years in summer or autumn, a tropical depression or remnant of a hurricane that has moved inland causes extremely heavy rains for 1 to 3 days.

History and Development

Carroll County was established in December 1833 from land ceded by the Choctaw Indians in the Treaty of Dancing Rabbit Creek *(10)*. Greenwood Leflore, the chief of the Choctaw Indians, was for the most part responsible for the ratification of the treaty *(12)*. The original Carroll County covered 900 square miles and extended from West Point to the Sunflower River. The county was named for Charles Carroll, an early settler, and the town of Carrollton was located at his home place.

The first settlement in the county was Songalo, a Choctaw village. This settlement was moved 1 mile in 1860 and was renamed Vaiden. Other settlements sprang up quickly, but many of the once thriving agricultural communities no longer exist. Carroll County remains mostly rural. The small urban population is concentrated in Carrollton, North Carrollton, and Vaiden.

Relief and Drainage

Carroll County is generally hilly except for the Mississippi River flood plain, or delta. The delta is a nearly level to gently sloping north-to-south strip along the western boundary of the county. The strip is 1 mile to 4 miles wide. The rest of the county is high, rugged hills with steep side slopes and narrow valleys; lower, more rolling hills, wider valleys, and gentler slopes; and flat flood plains. The maximum relief of the county is about 375 feet. The area of greatest relief is in the eastern part of the county, and the lowest is on the delta, which is flat. Some of the delta area is as low as 125 feet above sea level.

Most of Carroll County is within the drainage basin of the Yazoo River system, but the southeastern corner drains to the Big Black River (fig. 1). The main tributaries of the Yazoo River system are, in north to south order, the Potacocowa Creek, Teoc Creek, Big Sand Creek, Pelucia Creek, Coila Creek, and Abiacha Creek. Coila Creek is a branch of the Abiacha Creek. The main tributaries of the Big Black River are the Hays and Peachahala Creeks. The Big Sand and Abiacha Creeks are the largest streams in the county. All of the streams have relatively wide flood plains except in their upper courses. The larger streams have so many tributaries that almost every part of the county is reached by drainage courses. The streams form a dendritic pattern.

Physiography

Michael C. Seal, geologist, Mississippi Bureau of Geology, prepared this section.

Mississippi lies within the Gulf Coastal Plain province of North America. The state has been further divided into 12 physiographic units, 3 of which are in Carroll County. The Mississippi River Alluvial Plain is in the western part of the county, the Loess Hills lie east of the bluff line bordering the alluvial plain, and the North Central Hills are in the eastern two-thirds of the county. These physiographic provinces are distinguished easily on the geologic map at the back of this publication.

Natural Resources

About 50 percent of Carroll County is forest land. Pine and hardwoods are on the uplands, and stands of oak, hickory, sweetgum, hackberry, elm, tupelo gum, and baldcypress are on the flood plains. The wood from these forests is used mostly for paper, lumber, and plywood products.

Almost 21 percent of Carroll County is prime farmland, most of which is used for crop production.

Several large sand and gravel mines are in the county, mainly in the western part of the hill section. The gravel is used locally for roads, but much of it is hauled to surrounding areas. Some clay from the county is used in the manufacture of ceramics and brick.

Water Resources

Water for household use and for livestock generally is adequate. Most of the water used in the household is from wells, but several community water systems are in the county. The water used by livestock is mainly from perennial streams, manmade ponds, and springs. In winter, flow in most of the intermittent streams is large enough to water livestock.

About 130 watershed lakes are in Carroll County. Their main function is to reduce flooding and to control erosion and sediment, but these lakes are also used for fishing, recreation, and as sources of water for livestock. Several natural lakes are in the delta area of the county.

Figure 1.—The southeastern part of Carroll County drains into the Big Black River. The Chenneby-Arkabutla association, frequently flooded, formed on the flood plain of this river.

In recent years, catfish farming has contributed to the economy of the county. Several hundred acres of catfish ponds have been constructed.

How This Survey Was Made

This survey was made to provide information about the soils in Carroll County. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of rock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in Carroll County and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

Confidence Limits of Soil Survey Information

The statements about soil behavior in this survey can be thought of in terms of probability: they are predictions of soil behavior. The behavior of a soil depends not only on its own properties, but on responses to such variables as climate and biological activity. Soil conditions are predictable for the long term, but they are unpredictable from year to year. For example, while a soil scientist can state that a given soil has a high water table in most years, he cannot say with certainty that the water table will be present next year.

Confidence limits are statistical expressions of the probability that the composition of a map unit or a property of the soil will vary within prescribed limits. Confidence limits can be assigned numerical values based on a random sample. In the absence of specific data to determine confidence limits, the natural variability of soils and the way soil surveys are made must be considered. The composition of map units and other information is derived largely from extrapolations made from a small sample. The map units contain contrasting inclusions. Also, information about the soils does not extend below a depth of 5 or 6 feet. The information presented in the soil survey is not meant to be used as a substitute for onsite investigations. Soil survey information can be used to select from among alternative practices or general designs that may be needed to minimize the possibility of soil-related failures. It cannot be used to interpret specific points on the landscape.

Specific confidence limits for the composition of soil associations and soil complexes in Carroll County were determined by taking samples from random transects made across mapped areas. The data were statistically summarized and shown in table 4. Soil scientists made enough transects and took enough samples to characterize each map unit at an 80 percent confidence level. For example, in 80 percent of the areas mapped as Bruno-Tutwiler complex, the percentage of the soils will be within the range given in table 4. In as many as 20 percent of the areas of this map unit, the percentage of the soils can be either higher or lower than the given range.

The composition of the other map units in this survey is based on the judgment of the soil scientist and was not determined by a statistical procedure.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Each map unit is rated for *cultivated crops, pasture grasses and legumes, woodland, urban uses,* and *wildlife habitat.* Cultivated crops and pasture grasses and legumes are those grown extensively in the survey area. Woodland refers to areas of native or introduced trees. Urban uses include residential, commercial, and industrial developments. Wildlife habitat includes areas for openland wildlife, woodland wildlife, and wetland wildlife.

Nearly Level to Gently Sloping, Excessively Drained to Poorly Drained Soils; in Depressions and on Flood Plains, Natural Levees, and Alluvial Fans and Aprons

This group, which consists of general soil map units 1, 2, 3, 4, and 5, makes up about 22 percent of the county. The major soils are the silty Adler, Ariel, Arkabutla, Chenneby, Dubbs, Dundee, Falaya, Morganfield, and Oaklimeter soils; the loamy Bruno soils; and the clayey Sharkey soils.

1. Dundee-Dubbs-Sharkey

Nearly level, somewhat poorly drained, well drained, and poorly drained, silty and clayey soils; on natural levees, flood plains, and in depressions

This map unit is mainly in the western part of Carroll County on natural levees and flood plains of former channels of the Mississippi River and its tributaries. The landscape is nearly level with shallow drainageways, depressions, and a few old river runs and oxbow lakes. Slopes range from 0 to 2 percent.

This map unit makes up about 2 percent of the county. It is about 30 percent Dundee soils, 28 percent Dubbs soils, 24 percent Sharkey soils, and 18 percent soils of minor extent (fig. 2).

Dundee soils are somewhat poorly drained and are on natural levees on the delta. They formed in thinly stratified loamy alluvium; however, they have a silty surface layer.

Dubbs soils are well drained and are on natural levees on the delta. They formed in loamy alluvium; however, they have a silty surface layer.

Sharkey soils are poorly drained and are on flood plains and in depressions. They formed in clayey slack water sediment deposited by the Mississippi River or its tributaries. These soils are subject to frequent flooding.

Of minor extent in this map unit are the Alligator, Bonn, Adler, Tutwiler, and Bruno soils. The Alligator soils are on flood plains, and the Bonn soils are on low terraces and flood plains. These soils are poorly drained. Also included in a narrow band adjacent to the bluffs are Adler and Bruno soils on flood plains, and Tutwiler soils on natural levees and terraces. Adler soils are moderately well drained, Tutwiler soils are well drained, and Bruno soils are excessively drained.

Most of the acreage of this map unit has been cleared and is used for crops or pasture. Sharkey soils are poorly suited to crops because of frequent flooding, but the Dundee and Dubbs soils are well suited to row crops that are commonly grown in the county.

Dundee and Dubbs soils are moderately suited to grasses and legumes for hay and pasture. Sharkey soils are poorly suited to this use.

Dundee and Dubbs soils are well suited to use as woodland, and Sharkey soils are moderately suited.

Dubbs soils have slight limitations for most urban uses. Dundee soils have moderate limitations for most urban uses because of wetness and shrink-swell properties. Low strength is a severe limitation for local roads and streets. Sharkey soils have severe limitations for urban uses mainly because of flooding and wetness.

Dundee and Dubbs soils have good potential for use as habitat for openland and woodland wildlife. Sharkey soils have poor potential for use as openland wildlife habitat and fair potential for woodland wildlife. Dundee and Sharkey soils have fair potential for use as habitat

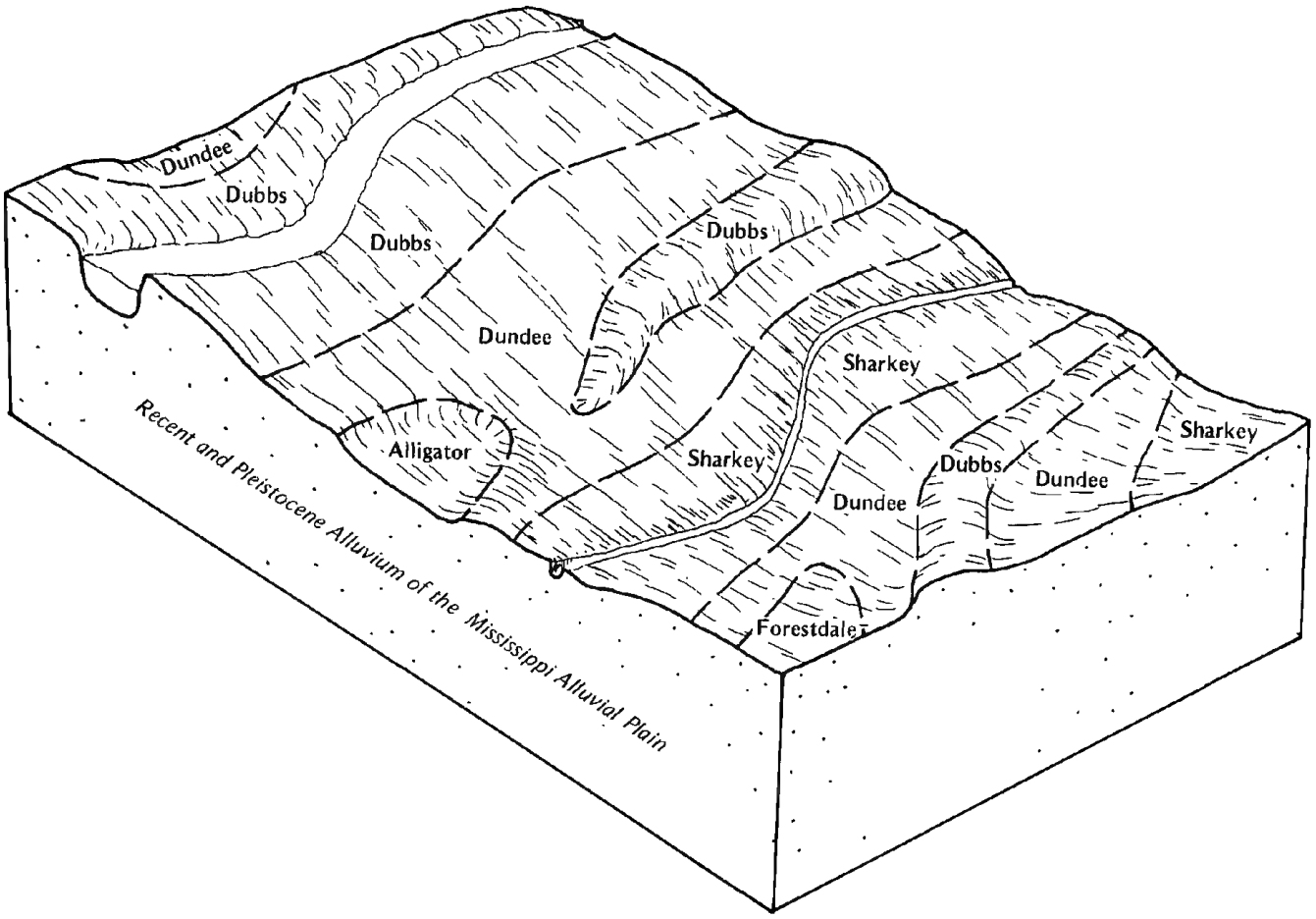


Figure 2.—Pattern of soils and underlying material in the Dundee-Dubbs-Sharkey general soil map unit.

for wetland wildlife. Dubbs soils have very poor potential for this use.

2. Chenneby-Arkabutla

Nearly level, somewhat poorly drained, silty soils; on flood plains

This map unit is in the eastern part of Carroll County on flood plains along the Big Black River. The landscape is nearly level, but numerous shallow drainageways and depressions meander through the area. Slopes range from 0 to 2 percent.

This map unit makes up about 2 percent of the county. It has about 49 percent Chenneby soils, 46 percent Arkabutla soils, and 5 percent soils of minor extent.

Chenneby and Arkabutla soils are somewhat poorly drained and are on flood plains. They formed in silty alluvium. Chenneby soils are at a slightly higher elevation than the Arkabutla soils and are along natural river channels. Arkabutla soils are in broad to depressional areas.

Of minor extent in this map unit are the Falaya, Oaklimeter, and Bruno soils. These soils are on flood plains. Falaya soils are somewhat poorly drained, and the Oaklimeter soils are moderately well drained. These soils formed in silty alluvium. Bruno soils are excessively drained. They formed in sandy alluvium.

The soils of this map unit are used mostly as woodland. About 40 percent of the acreage has been cleared and is used as pasture or hayland. A small acreage is used for row crops.

These soils are poorly suited to row crops because of frequent flooding during winter and spring. They are moderately suited to grasses and legumes for hay and pasture and well suited to use as woodland.

These soils have severe limitations for urban uses because of wetness and flooding.

The soils of this map unit have fair potential for use as habitat for openland and wetland wildlife. They have good potential for use as habitat for woodland wildlife.

3. Sharkey

Nearly level, poorly drained, clayey soils; in depressional slack water areas and old river runs

This map unit is in the western part of Carroll County in depressional slack water areas of the delta. The landscape is nearly level, and the soils remain ponded for several months each year. Many old river runs and oxbow lakes are throughout the area. Slopes are 0 to 2 percent.

This map unit makes up about 1 percent of the county. It is about 84 percent Sharkey soils and 16 percent soils of minor extent.

Sharkey soils formed in clayey slack water sediment deposited by the Mississippi River and its tributaries. These soils are ponded for long periods and are difficult to drain because of inadequate outlets.

Of minor extent in this map unit are the Adler, Oaklimeter, Bonn, Dubbs, and Dundee soils. Adler and Oaklimeter soils are around the perimeter of this map unit at a higher elevation than the Sharkey soils. They are moderately well drained. Bonn soils are on low terraces and are poorly drained. Also included on natural levees are a few narrow ridges and bands of Dubbs and Dundee soils. Dubbs soils are well drained, and Dundee soils are somewhat poorly drained.

The Sharkey soils are used mainly as woodland and are moderately suited to this use. Because of the long periods of ponding, they are poorly suited to crops and to grasses and legumes for hay and pasture.

The Sharkey soils have severe limitations for urban uses because of ponding and wetness.

These soils have poor potential for use as habitat for openland wildlife and fair potential for use as habitat for woodland and wetland wildlife.

4. Adler-Bruno-Morganfield

Nearly level and gently sloping, moderately well drained, excessively drained, and well drained, silty and loamy soils; on flood plains and alluvial fans and aprons

This map unit is mostly in the western part of Carroll County on flood plains along most streams of the area and on broad alluvial fans and aprons extending into the delta. Slopes range from 0 to 5 percent.

This map unit makes up about 11 percent of the county. It is about 50 percent Adler soils, 23 percent Bruno soils, 7 percent Morganfield soils, and 20 percent soils of minor extent (fig. 3).

Adler soils are moderately well drained and are on flood plains and alluvial fans and aprons. These soils formed in silty alluvium.

Bruno soils are excessively drained and are on flood plains. These soils formed in sandy alluvium, but they have a loamy surface layer.

Morganfield soils are well drained and are on flood plains and alluvial fans and aprons. These soils formed in silty alluvium.

Of minor extent in this map unit are the Grenada, Bonn, Oaklimeter, and Tutwiler soils. Grenada soils are on terraces and are moderately well drained. Bonn soils are on low terraces and flood plains and are poorly drained. Oaklimeter soils are on flood plains and are moderately well drained. Tutwiler soils are on natural levees and terraces and are well drained.

Most of the acreage of this map unit has been cleared and is used for crops or pasture.

Adler and Morganfield soils are well suited to row crops, grasses and legumes for hay and pasture, and to use as woodland. Bruno soils are moderately suited to row crops and poorly suited to grasses and legumes for pasture. Productivity is low because of the low available water capacity. Bruno soils are well suited to use as woodland.

Except in protected areas, the soils of this map unit have severe limitations for urban uses because of flooding.

Adler and Morganfield soils have good potential for use as habitat for openland and woodland wildlife, and Bruno soils have poor potential. The soils of this map unit have poor or very poor potential for use as habitat for wetland wildlife.

5. Oaklimeter-Ariel-Falaya

Nearly level, moderately well drained, well drained, and somewhat poorly drained, silty soils; on flood plains

This map unit is mostly along flood plains in the eastern part of Carroll County. Slopes are 0 to 2 percent.

This map unit makes up about 6 percent of the county. It is about 65 percent Oaklimeter soils, 20 percent Ariel soils, 10 percent Falaya soils, and 5 percent soils of minor extent (fig. 4).

Oaklimeter soils are moderately well drained, and Ariel soils are well drained. Falaya soils are somewhat poorly drained and are in the lower-lying areas of the flood plains. All of these soils formed in silty material.

Of minor extent in this map unit are the Calloway, Adler, and Bruno soils. Calloway soils are on terraces and are somewhat poorly drained. Adler and Bruno soils are on flood plains. Adler soils are moderately well drained, and Bruno soils are excessively drained.

The soils of this map unit are used mostly as cropland.

These soils are well suited to row crops and to use as woodland. The Ariel and Falaya soils are moderately suited to grasses and legumes for hay and pasture, and the Oaklimeter soils are well suited to this use.

The soils of this map unit have severe limitations for urban uses because of flooding.

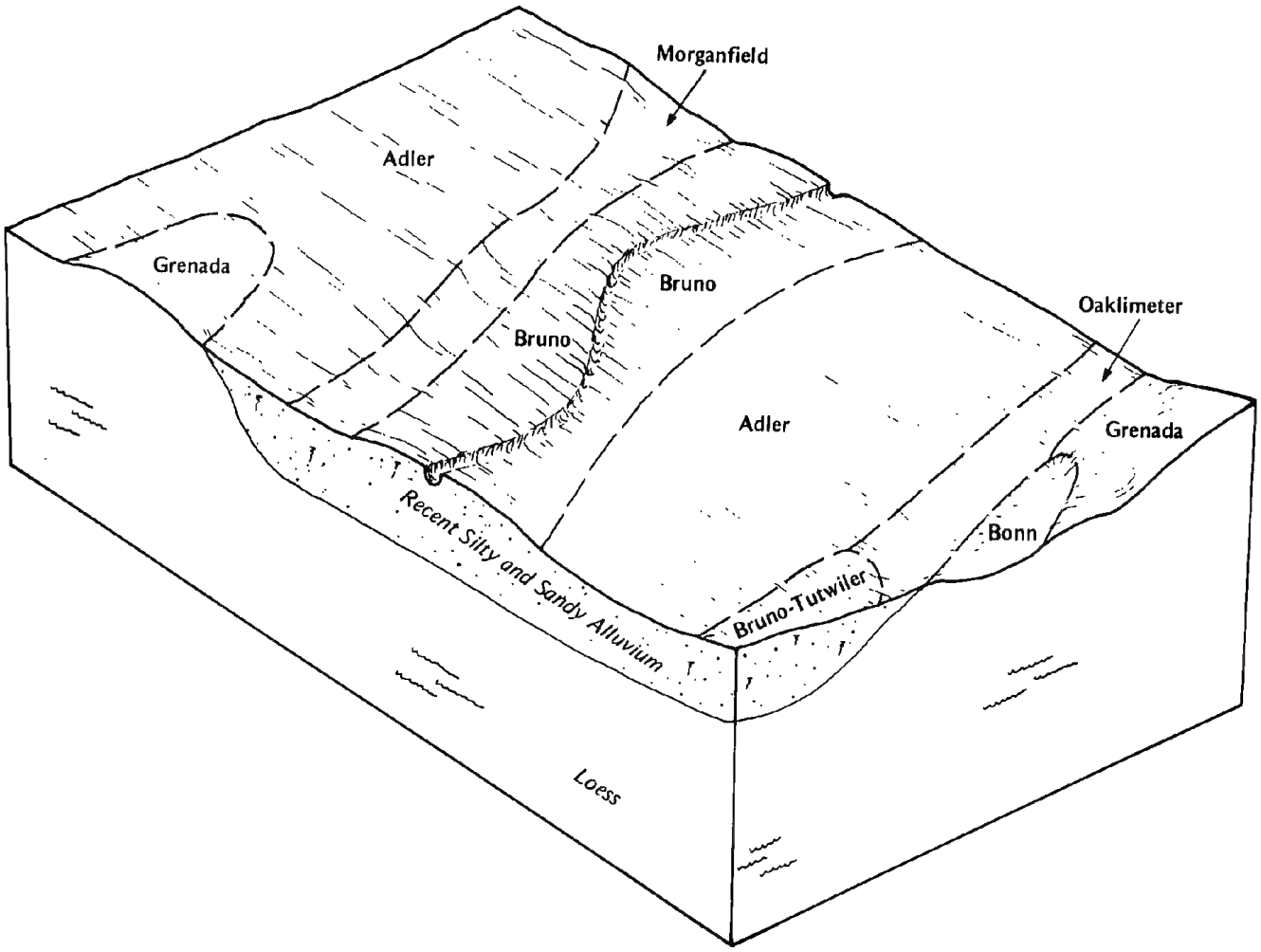


Figure 3.—Pattern of soils and underlying material in the Adler-Bruno-Morganfield general soil map unit.

These soils have good potential for use as habitat for openland and woodland wildlife. Oaklimeter and Ariel soils have poor to very poor potential for use as habitat for wetland wildlife, and Falaya soils have fair potential.

Nearly Level to Hilly, Moderately Well Drained and Well Drained Soils; on Uplands and Terraces

This group, which consists of general soil map units 6, 7, 8, 9, 10, and 11, makes up about 78 percent of the county. The major soils are the silty Lexington, Loring, Memphis, Natchez, and Providence soils and the loamy Saffell and Smithdale soils.

6. Memphis-Loring-Natchez

Nearly level to hilly, well drained and moderately well drained, silty soils, some of which have a fragipan; on uplands and terraces

This map unit is on uplands and terraces in the western part of Carroll County. The bluff hills are a part of this map unit. The landscape is nearly level to strongly sloping ridgetops and strongly sloping to steep hillsides that are dissected by short drainageways and narrow flood plains. The soils in this map unit formed in silty material. Slopes range from 0 to 45 percent.

This map unit makes up about 24 percent of the county. It is about 47 percent Memphis soils, 19 percent Loring soils, 7 percent Natchez soils, and 27 percent soils of minor extent (fig. 5).

Memphis soils are on hillsides and ridgetops of uplands and on terraces. These soils are well drained.

Loring soils are on upland ridgetops and hillsides. These soils are moderately well drained, and they have a fragipan.

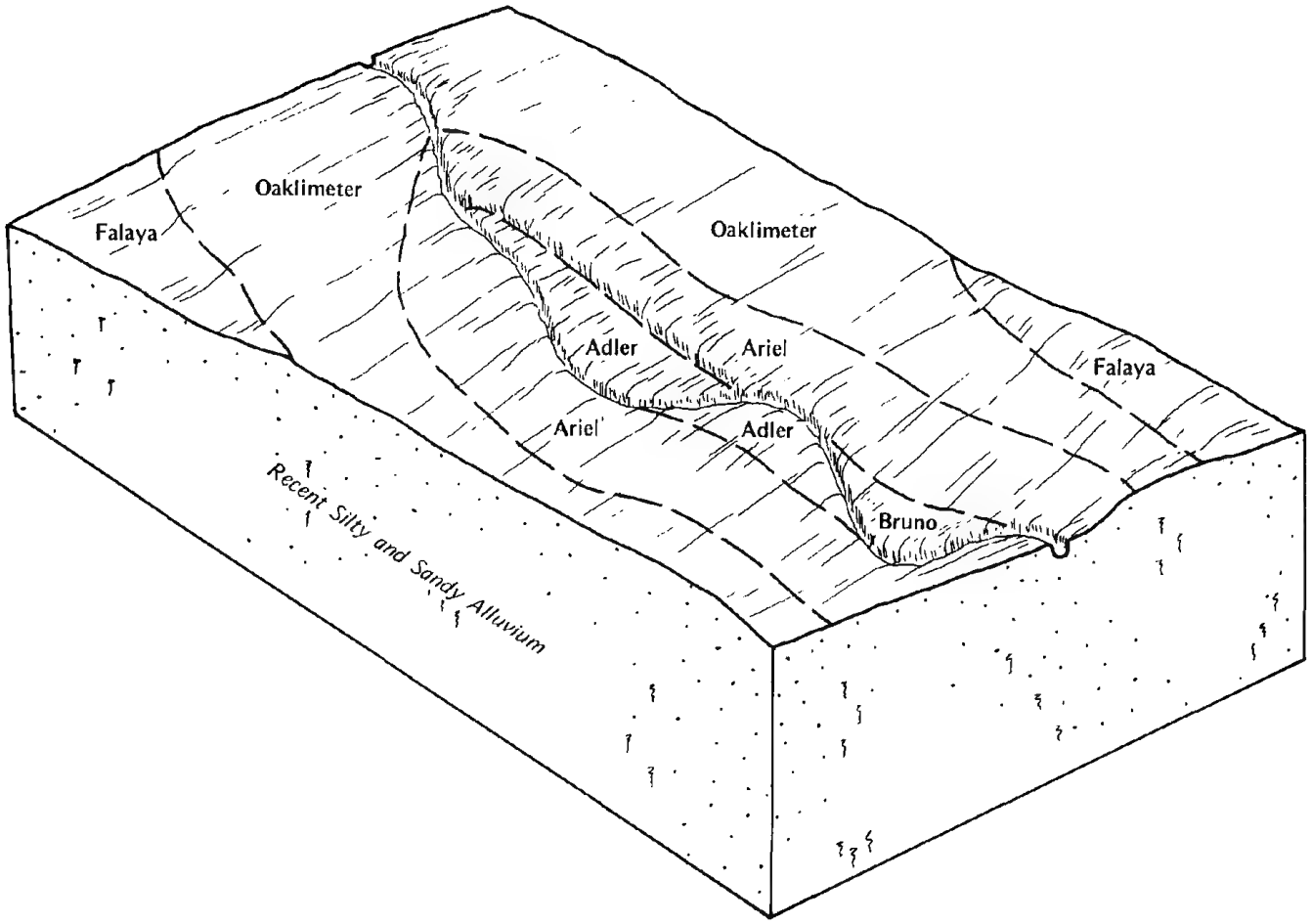


Figure 4.—Pattern of soils and underlying material in the Oaklimeter-Ariel-Falaya general soil map unit.

Natchez soils are mostly on hillsides. These soils are well drained.

Of minor extent in this map unit are the Adler and Grenada soils. These soils are moderately well drained. The Adler soils are on flood plains. The Grenada soils are on uplands and terraces and have a fragipan.

The soils of this map unit are used mostly as woodland. Large acreages have been cleared and are used for pasture or row crops.

The nearly level and gently sloping soils on ridges and hillsides are well suited to row crops, but the strongly sloping and severely eroded soils are poorly suited to this use. On hillsides, steepness of slope and the hazard of erosion are the main limitations for row crops.

The soils in nearly level areas are well suited to grasses and legumes for pasture and hay. Those in gently sloping to strongly sloping areas are only moderately suited to use as pasture, and soils in the hilly and steep areas are poorly suited.

Memphis and Natchez soils are well suited to use as woodland, but Loring soils are only moderately suited.

The Memphis soils in nearly level to gently sloping areas have slight limitations for most urban uses; however, low strength is a severe limitation for local roads and streets. The Memphis soils in strongly sloping areas have severe limitations because of steepness of slope. Loring soils have moderate limitations for urban uses because of wetness and steepness of slope. Natchez soils have severe limitations because of steepness of slope.

The soils of this map unit have good potential for use as habitat for woodland wildlife and very poor potential for use as habitat for wetland wildlife. The Memphis and Loring soils in nearly level to strongly sloping areas have good potential for use as habitat for openland wildlife. In steep areas, they have fair or poor potential. Natchez

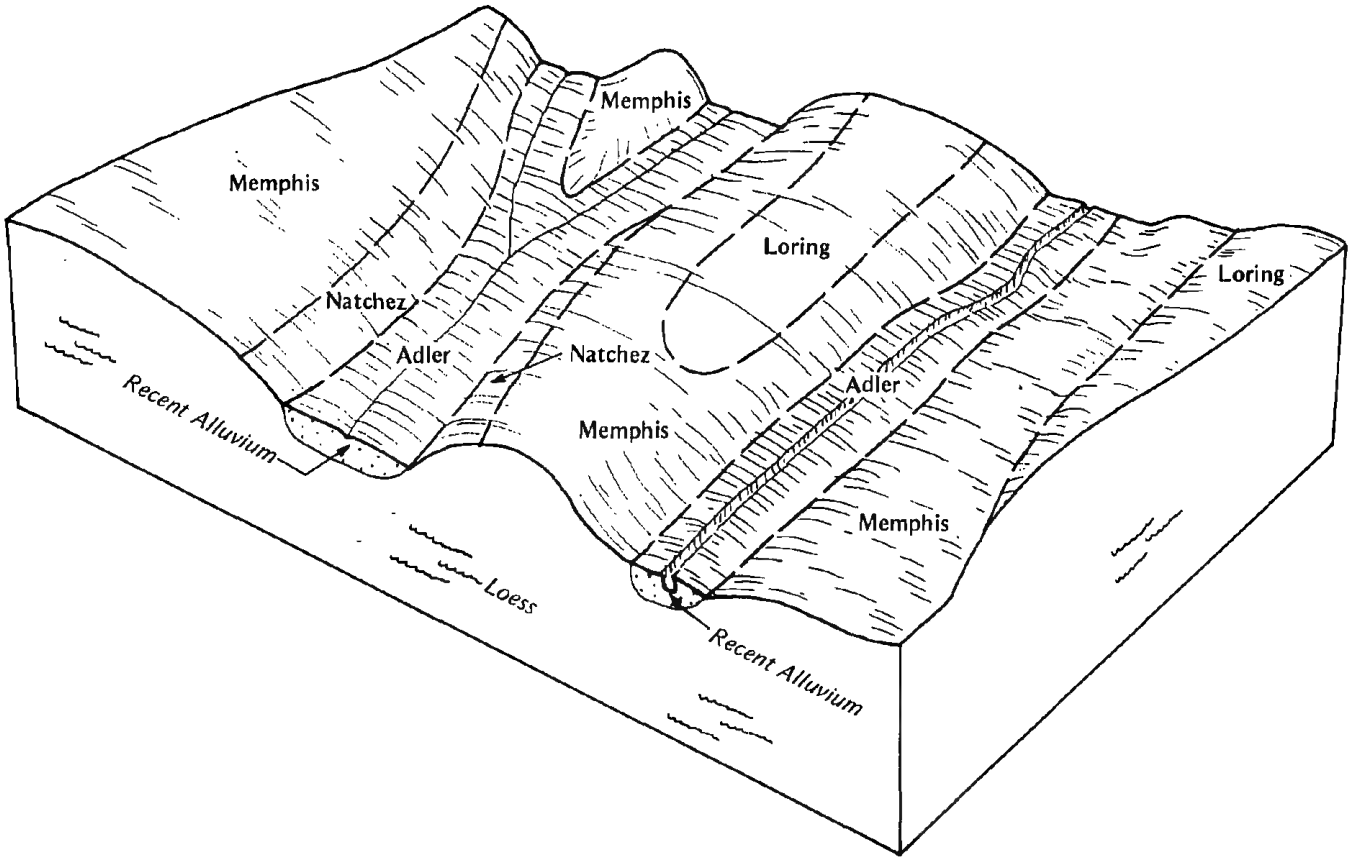


Figure 5.—Pattern of soils and underlying material in the Memphis-Loring-Natchez general soil map unit.

soils have fair potential for use as habitat for openland wildlife.

7. Loring-Providence-Smithdale

Gently sloping to steep, moderately well drained and well drained, silty and loamy soils, some of which have a fragipan; on uplands

This map unit is in the north-central part of Carroll County. The landscape is strongly sloping to steep hillsides and gently sloping to strongly sloping ridgetops that are generally less than an eighth of a mile wide. The area is dissected by many short drainageways and narrow flood plains. Slopes range from 2 to 40 percent.

This map unit makes up about 10 percent of the county. It is about 30 percent Loring soils, 22 percent Providence soils, 20 percent Smithdale soils, and 28 percent soils of minor extent.

Loring soils are on gently sloping hillsides and hilltops and on the upper part of steep hillsides. These soils are moderately well drained, and they have a fragipan. They formed in silty material.

Providence soils are on hilltops and the upper part of hillsides. These soils are moderately well drained, and they have a fragipan. They formed in silty material and underlying loamy material.

Smithdale soils are on hillsides and are well drained. They formed in loamy material.

Of minor extent in this map unit are the Ariel, Oaklimeter, and Lexington soils. Ariel and Oaklimeter soils are on narrow flood plains, and Lexington soils are on upland hillsides. The Ariel and Lexington soils are well drained, and the Oaklimeter soils are moderately well drained.

The soils of this map unit are used mainly as woodland. Smaller acreages are used for pasture or cultivated crops.

The gently sloping soils on ridges are well suited to row crops. The severely eroded and steeper areas of this map unit are poorly suited to row crops. The main limitation is steepness of slope, and erosion is a hazard.

The gently sloping to strongly sloping areas of these soils are moderately suited to pasture grasses and legumes. The soils on steep slopes are poorly suited.

The soils of this map unit are moderately suited to use as woodland.

Gently sloping areas of Loring and Providence soils have moderate limitations for urban uses, mainly because of wetness and low strength as it applies to local roads and streets. The Smithdale soils have severe limitations for urban uses because of the steepness of slope.

The gently sloping to sloping soils of this map unit have good potential for use as habitat for openland and woodland wildlife. The steeper Smithdale soils have fair potential for openland wildlife. Potential for use as habitat for wetland wildlife is very poor for the soils of this map unit.

8. Smithdale-Providence-Lexington

Sloping to hilly, well drained and moderately well drained, loamy and silty soils, some of which have a fragipan; on uplands

This map unit is mainly in the eastern part of Carroll County. The landscape is steep hillsides and gently sloping to strongly sloping ridgetops that are generally less than an eighth of a mile wide. The slopes are dissected by many short drainageways and by narrow flood plains. Slopes range from 5 to 40 percent.

The map unit makes up about 10 percent of the county. It is about 40 percent Smithdale soils, 23 percent Providence soils, 20 percent Lexington soils, and 17 percent soils of minor extent (fig. 6).

Smithdale soils are on hillsides and are well drained. They formed in loamy material.

Providence soils are on ridgetops and the upper part of hillsides. These soils are moderately well drained, and they have a fragipan. They formed in silty material and underlying loamy material.

Lexington soils are on upland hillsides and are well drained. They formed in silty material and underlying loamy material.

Of minor extent in this map unit are the Ariel, Oaklimeter, and Grenada soils. Ariel and Oaklimeter soils are on flood plains, and Grenada soils are on uplands and stream terraces. The Ariel soils are well drained, and the Oaklimeter and Grenada soils are moderately well drained. The Grenada soils have a fragipan.

The soils of this map unit are used mainly as woodland. Smaller acreages are used for pasture or cultivated crops.

The soils of this map unit are poorly suited to row crops because of steepness of slope and the hazard of erosion. Most of these soils are moderately suited to

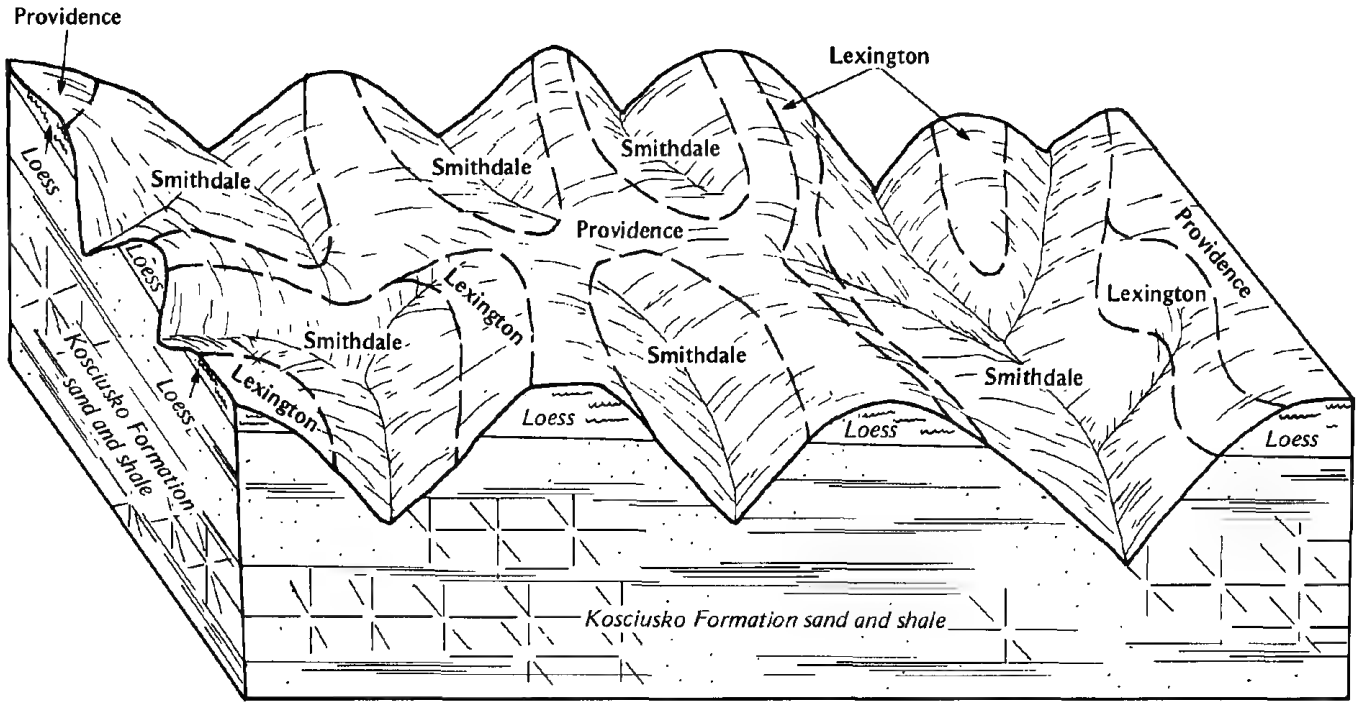


Figure 6.—Pattern of soils and underlying material in the Smithdale-Providence-Lexington general soil map unit.

grasses and legumes for hay and pasture and to use as woodland. The soils in very steep areas are poorly suited to use as pasture.

The Providence soils have moderate limitations for urban uses mainly because of wetness and low strength as it affects local roads and streets. The steep and very steep areas of Smithdale and Lexington soils have severe limitations because of steepness of slope.

The Smithdale and Lexington soils have fair potential for use as habitat for openland wildlife, and the Providence soils have good potential for this use. The soils of this map unit have good potential for use as habitat for woodland wildlife and very poor potential for wetland wildlife habitat.

9. Memphis-Smithdale-Providence

Nearly level to hilly, well drained and moderately well drained, silty and loamy soils, some of which have a fragipan; on uplands

This map unit is mainly in the south-central part of Carroll County. The landscape is steep hillsides and gently sloping to strongly sloping hilltops. The slopes are dissected by many short drainageways and by narrow flood plains. Slopes range from 0 to 40 percent.

This map unit makes up about 19 percent of the county. It is about 32 percent Memphis soils, 29 percent Smithdale soils, 14 percent Providence soils, and 25 percent soils of minor extent.

Memphis soils are on hillsides and hilltops and are well drained. They formed in silty material.

Smithdale soils are on hillsides and are well drained. They formed in loamy material.

Providence soils are on hilltops and the upper part of hillsides. These soils are moderately well drained, and they have a fragipan. They formed in silty material and underlying loamy material.

Of minor extent in this map unit are the Ariel, Oaklimeter, Falaya, Maben, Lexington, and Calloway soils. Ariel, Oaklimeter, and Falaya soils are on flood plains. Maben and Lexington soils are on hillsides, and Calloway soils are on uplands and terraces. The Ariel, Maben, and Lexington soils are well drained. The Oaklimeter soils are moderately well drained, and the Falaya and Calloway soils are somewhat poorly drained.

The soils of this map unit are used mainly as woodland. Small areas are used for pasture or cultivated crops.

The nearly level to gently sloping areas of Memphis soils on hilltops and stream terraces are well suited to row crops and pasture. Most of the area is poorly suited to use as cropland because of steepness of slope and the hazard of erosion.

Most of the soils of this map unit are moderately suited to grasses and legumes for hay and pasture. The nearly level Memphis soils are well suited and the soils in moderately steep to steep areas are poorly suited to this use.

The Memphis soils are well suited to use as woodland, and the Smithdale and Providence soils are moderately suited to this use.

The Memphis soils on nearly level and gently sloping ridges have slight limitations for urban uses. On steep hillsides, they have severe limitations. Low strength is a severe limitation for local roads and streets. Smithdale soils have severe limitations for urban uses because of steepness of slope. Sloping and strongly sloping areas of Providence soils have moderate limitations for most urban uses. Low strength as it applies to local roads and streets and steepness of slope as it applies to small commercial buildings are the main limitations.

Most areas of Memphis soils have good potential for use as habitat for openland wildlife. The potential is poor for soils in steep areas. The soils of this map unit have good potential for use as habitat for woodland wildlife and very poor potential for wetland wildlife habitat.

10. Natchez-Memphis-Saffell

Nearly level to hilly, well drained, silty and loamy soils, some of which have gravel in the subsoil; on uplands and terraces

This map unit is in a narrow band along the bluff adjacent to the delta in the western part of Carroll County. The landscape is hilly. It is marked by a few narrow, nearly level to strongly sloping ridgetops and very steep hillsides that are dissected by many short drainageways and narrow flood plains. Slopes range from 0 to more than 45 percent.

This map unit makes up about 3 percent of the county. It is about 35 percent Natchez soils, 30 percent Memphis soils, 11 percent Saffell soils, and 24 percent soils of minor extent (fig. 7).

Natchez soils are on steep hillsides and are well drained. They formed in silty material on uplands.

Memphis soils are on hillsides and ridgetops of uplands and terraces. They are well drained. These soils formed in silty material.

Saffell soils are on hillsides and are well drained. They formed in gravelly material on uplands.

Of minor extent in this map unit are the Loring and Adler soils. Loring soils are on upland ridgetops and are moderately well drained. Adler soils are on flood plains and are moderately well drained.

Except for the soils in a few small areas on ridgetops, the soils of this map unit are used as woodland.

The nearly level to gently sloping soils on the ridgetops are well suited to row crops most commonly grown in the county. The soils on steep hillsides are poorly suited to row crops because of steepness of slope and the hazard of erosion.

The soils on nearly level ridgetops are well suited to grasses and legumes for hay and pasture, and those in gently sloping to moderately steep areas are moderately

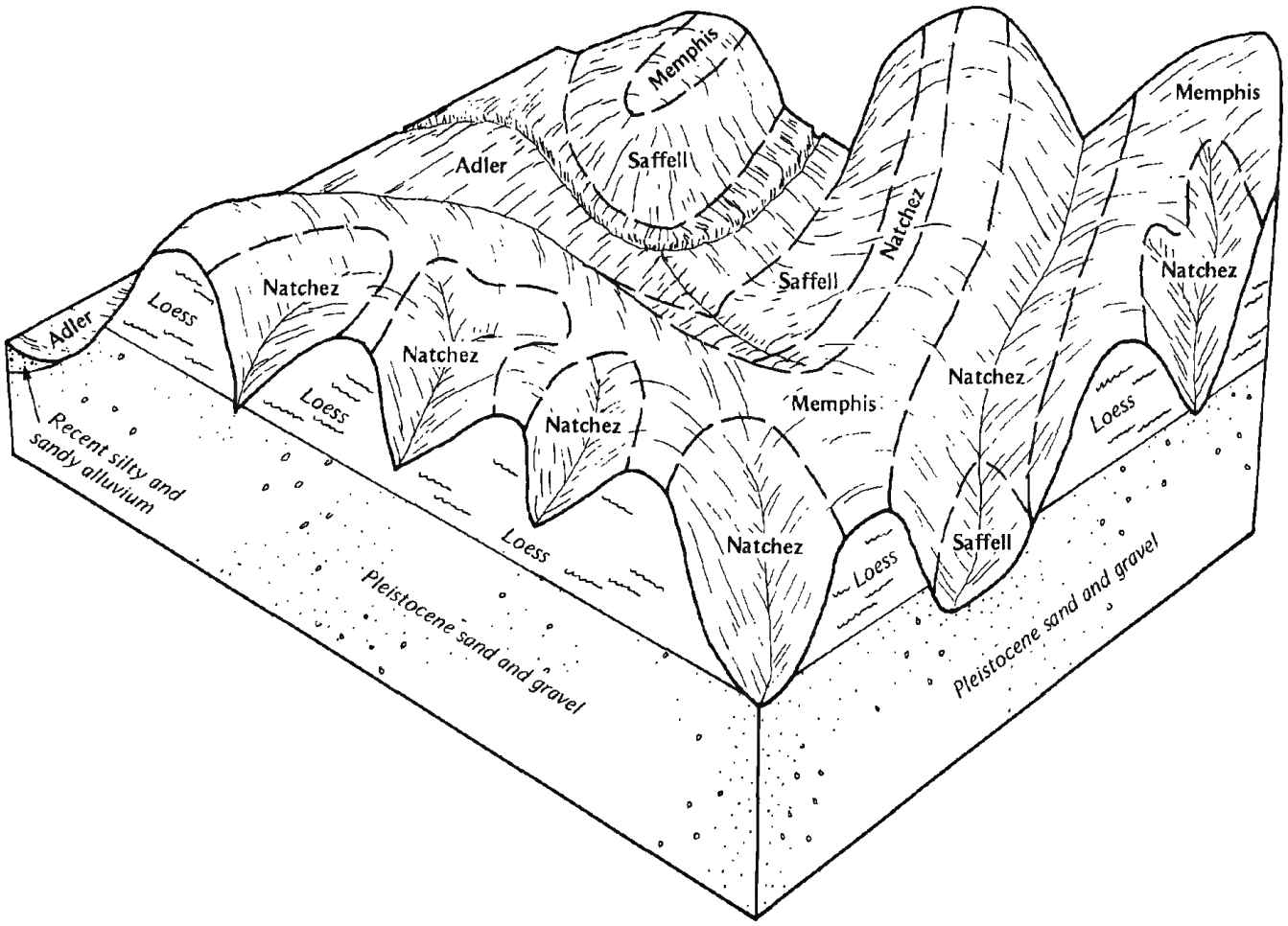


Figure 7.—Pattern of soils and underlying material in the Natchez-Memphis-Saffell general soil map unit.

suited. The soils in steep, hilly areas are poorly suited because of low productivity.

The Memphis and Natchez soils are well suited to use as woodland. The Saffell soils are poorly suited to this use because of low productivity.

The soils of this map unit have severe limitations for urban uses because of steepness of slope. The nearly level to gently sloping areas of Memphis soils on ridgetops have slight limitations for most urban uses. Low strength is a severe limitation for local roads and streets.

Natchez soils have fair potential for use as habitat for openland wildlife. Memphis soils on ridgetops have good potential for this use, but the potential is poor for areas of these soils on the steep hillsides. Saffell soils have poor potential for use as habitat for openland wildlife. Natchez and Memphis soils have good potential and Saffell soils have fair potential for use as habitat for woodland wildlife. The soils of this map unit have very poor potential for use as habitat for wetland wildlife.

11. Providence-Loring

Sloping to steep, moderately well drained, silty soils that have a fragipan; on uplands

This map unit is mainly in the eastern part of Carroll County. The landscape is gently sloping to sloping ridgetops and sloping to steep hillsides that are dissected by short drainageways and narrow flood plains. Slopes range from 5 to 20 percent.

This map unit makes up about 12 percent of the county. It is about 41 percent Providence soils, 31 percent Loring soils, and 28 percent soils of minor extent.

Providence soils are on ridgetops and hillsides. These soils are moderately well drained, and they have a

fragipan. They formed in silty material and underlying loamy material.

Loring soils are on ridgetops and hillsides. These soils are moderately well drained, and they have a fragipan. They formed in silty material.

Of minor extent are the Ariel, Oaklimeter, Falaya, Dulac, Memphis, Smithdale, and Maben soils. Ariel, Oaklimeter, and Falaya soils are on flood plains. Dulac soils are on ridges and hillsides. Memphis, Smithdale, and Maben soils are on hillsides. Ariel, Memphis, Smithdale, and Maben soils are well drained. Oaklimeter and Dulac soils are moderately well drained, and Falaya soils are somewhat poorly drained.

Most of the acreage of this map unit has been cleared and is used as pasture or cropland. A small acreage is used as woodland.

The sloping areas of Loring soils are moderately suited to row crops. The severely eroded areas and strongly sloping to steep areas of Providence and Loring soils are poorly suited to this use.

In many areas, the soils of this map unit are moderately suited to grasses and legumes for pasture and hay. The soils in steep areas are poorly suited.

The soils of this map unit are moderately suited to use as woodland.

These soils have moderate limitations for urban uses because of wetness and steepness of slope. The fragipan layer limits the use of these soils for septic tank absorption fields.

Most areas of these soils have good potential for use as habitat for openland and woodland wildlife and very poor potential for wetland wildlife habitat. In steeper areas, the Loring soils have fair potential for use as habitat for openland wildlife.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in Carroll County. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Memphis silt loam, 0 to 2 percent slopes, is one of several phases in the Memphis series.

Some map units are made up of two or more major soils. These map units are called soil complexes or soil associations.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Bruno-Tutwiler complex is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Smithdale-Providence-Lexington association, hilly, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Gullied land in the Gullied land-Loring complex is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 5 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

1A—Calloway silt loam, 0 to 1 percent slopes. This soil is nearly level and is somewhat poorly drained. It has a fragipan. This soil formed in silty material on uplands and terraces along major streams.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:

0 to 6 inches; dark brown silt loam

Subsoil:

6 to 11 inches; yellowish brown silt loam that has brownish mottles

11 to 15 inches; mottled yellowish brown, pale brown, and light brownish gray silt loam

15 to 20 inches; light brownish gray silt that has yellowish brown compact and brittle soil bodies

20 to 60 inches or more; fragipan that is silt loam mottled in shades of brown and gray

Important soil properties:

Permeability: moderate in upper part of the subsoil and slow in the fragipan

Available water capacity: moderate

Soil reaction: very strongly acid to medium acid in the surface layer and upper part of the subsoil except where lime has been added; strongly acid to mildly alkaline in the lower part of the subsoil

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: perched above the fragipan at a depth of 1 to 2 feet in winter and early in spring

Flooding: none

Root zone: fragipan restricts roots and limits amount of water available to plants

Tilth: good in the surface layer, but soil crusts and packs after hard rains and a plowpan forms easily if the soil is tilled when wet

Included with this soil in mapping are small areas of Grenada, Oaklimeter, and Bonn soils. Grenada soils are slightly higher on uplands and terraces than the Calloway soil. Oaklimeter soils are on flood plains, and Bonn soils are on low terraces and flood plains.

This Calloway soil is mainly used for crops or pasture. A small acreage is used as woodland.

This soil is well suited to row crops, truck crops, and small grains. Plant rows should be arranged and field ditches constructed to remove excess surface water. Conservation tillage is recommended. Returning crop residue to the soil improves soil fertility, helps to maintain tilth, and reduces crusting and packing.

This soil is moderately suited to grasses and legumes for hay and pasture. Proper stocking, controlled grazing, and weed and brush control help control erosion, slow runoff, and help keep the pasture and soil in good condition. Restricted use during wet periods reduces compaction.

This soil is well suited to cherrybark oak, loblolly pine, shortleaf pine, sweetgum, water oak, and yellow poplar. It has no major soil related management limitations for normal forestry operations.

This soil has severe limitations for urban uses. Low strength, as it applies to local roads and streets, and seasonal wetness are the major limitations. Proper design and careful installation can help offset these limitations. Wetness and the slow permeability in the fragipan are severe limitations for septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Calloway soil is in capability subclass IIw. The woodland ordination symbol is 8W.

2A—Dubbs silt loam, 0 to 2 percent slopes. This soil is nearly level and is well drained. It is on the higher parts of natural levees bordering former channels and streams of the Mississippi River tributaries. It formed in silty material.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 5 inches; dark brown silt loam

Subsoil:
5 to 25 inches; dark yellowish brown silt loam that has brownish mottles
25 to 39 inches; dark brown silt loam that has grayish brown mottles
39 to 60 inches; dark yellowish brown silt loam that has grayish brown mottles

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, to a depth of 60 inches or more

Tilth: easy to maintain, soil can be worked throughout a fairly wide range of moisture content

Included with this soil in mapping are a few areas of Dundee soils. The soils are mostly at a slightly lower elevation on natural levees than the Dubbs soil. Also included are a few areas of soils that have slopes of more than 2 percent.

This soil is well suited to row crops and small grains. Conservation tillage and cover crops reduce runoff and help to control erosion. Plant rows should be aligned to remove excess surface water. Crops on this soil respond well to fertilizer, and tilth is easy to maintain by returning crop residue to the soil.

This soil is well suited to grasses and legumes for hay and pasture. Proper stocking, controlled grazing, and weed and brush control help control erosion, slow runoff, reduce surface compaction, and keep the soil and pasture in good condition.

This soil is well suited to eastern cottonwood, cherrybark oak, sweetgum, Nuttall oak, Shumard oak, water oak, green ash, and willow oak. It has no major limitations for normal forestry operations.

This soil is well suited to most urban uses. Limitations for septic tank absorption fields are slight.

This Dubbs soil is in capability class I. The woodland ordination symbol is 10A.

3A—Dundee silt loam, 0 to 2 percent slopes. This soil is nearly level and is somewhat poorly drained. It is on the lower parts of older natural levees that border former channels of Mississippi River tributaries. This soil formed in thinly stratified, loamy alluvial sediment.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:

0 to 9 inches; dark brown silt loam that has grayish and brownish mottles below a depth of about 5 inches

Subsoil:

9 to 23 inches; grayish brown clay loam that has brownish mottles

23 to 32 inches; gray loam that has brownish mottles

Substratum:

32 to 44 inches; grayish brown silty clay loam that has brownish mottles

44 to 72 inches; light brownish gray silt loam that has brownish mottles

Important soil properties:

Permeability: moderately slow

Available water capacity: high

Soil reaction: very strongly acid to medium acid in the surface layer and subsoil except where lime has been added; very strongly acid to neutral in the substratum

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: within 1.5 to 3.5 feet of the surface in winter and early in spring

Flooding: none

Root zone: deep, to a depth of 60 inches or more

Tilth: easy to maintain, but soil tends to crust after hard rains

Included with this soil in mapping are a few areas of Dubbs and Forestdale soils. Dubbs soils are in slightly higher areas than the Dundee soil, and Forestdale soils are in low areas of natural levees. Also included are small areas of gently undulating soils.

This Dundee soil is used mainly for crops. Small acreages are used as pasture or woodland.

This Dundee soil is well suited to row crops and small grains. Because excess water is a moderate hazard in places, proper row arrangement and surface drainageways are needed. Conservation tillage is recommended. Crops on this soil respond well to fertilizer, and tilth is easy to maintain by returning crop residue to the soil.

This soil is moderately suited to grasses and legumes for hay and pasture. Proper stocking, controlled grazing, and weed and brush control help control erosion, slow runoff, and help keep the pasture and soil in good condition. Restricted use during wet periods reduces surface compaction.

This soil is well suited to eastern cottonwood, cherrybark oak, sweetgum, and water oak. Wetness imposes moderate to severe limitations for forest management operations, such as logging and reforestation. Logging operations should be restricted to seasonal dry periods late in summer and in fall. Logging on wet soils causes compaction and can reduce site productivity. Seedling mortality is high on these sites because of the increased competition from undesirable vegetation. Mechanical cultivation, approved herbicides, and an increased planting rate can overcome this problem.

This soil is moderately suited to most urban uses. Wetness and shrink-swell properties of the subsoil are moderate limitations for dwellings without basements. Low strength is a severe limitation for local roads and streets. Wetness is a severe limitation for dwellings with basements. Wetness and the moderately slow permeability of the subsoil are severe limitations for septic tank absorption fields. Installing perimeter drains and enlarging absorption field size can partly overcome these limitations.

This Dundee soil is in capability subclass IIw. The woodland ordination symbol is 12W.

3C3—Dulac silt loam, 5 to 8 percent slopes, severely eroded. This soil is sloping and moderately well drained. It has a fragipan. This soil formed in a mantle of silty material overlying clayey material. It is on ridgetops and hillsides on uplands.

In most areas of this soil, the original surface layer has been removed by erosion and the plow layer is subsoil. The surface layer is a mixture of topsoil and subsoil in some small areas. Rills and shallow gullies are common. Deep gullies have formed in a few areas. They cannot be crossed with farm machinery.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 1 inch; dark yellowish brown silt loam

Subsoil:
1 to 17 inches; strong brown silty clay loam
17 to 33 inches; dark yellowish brown silt loam fragipan that has mottles in shades of gray and brown
33 to 40 inches; yellowish red silty clay that has mottles in shades of brown and gray
40 to 65 inches; red clay that has mottles in shades of gray

Important soil properties:

Permeability: moderate in the upper part of the subsoil and slow in the fragipan

Available water capacity: moderate

Soil reaction: very strongly acid or strongly acid except where lime has been added

Surface runoff: medium to rapid

Erosion hazard: severe

Seasonal high water table: perched above the fragipan at 1 to 2 feet below the surface in wet periods

Flooding: none

Root zone: shallow, the fragipan restricts root growth at a depth of 1.5 to 2.5 feet

Tilth: soil tends to crust and pack; can be cultivated throughout a moderate range of moisture content

Included with this soil in mapping are small areas of soils on uplands that have a silty clay loam surface layer and small areas of soils where erosion has exposed the fragipan and underlying clayey subsoil. Also included are small areas of Providence and Loring soils. These soils are in upland positions similar to those of the Dulac soil.

This Dulac soil is mainly used for pasture or crops. A small acreage is used as woodland.

This soil is poorly suited to row crops, truck crops, and small grains because erosion is a hazard. Further loss by erosion is possible if cultivated crops are grown. These soils are better suited to a permanent cover of grasses and legumes or trees. Conservation tillage, return of crop residue to the soil, crop rotation, contour stripcropping, contour farming, and terraces and grassed waterways are needed if this soil is cultivated.

This soil is moderately suited to grasses and legumes for pasture or hay. The plants help slow runoff and control erosion. Smoothing rills and shaping gullies can make mowing and other production practices easier. Overgrazing or grazing when the soil is too wet can cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help keep the pasture and soil in good condition.

This soil is moderately suited to loblolly pine, shortleaf pine, Shumard oak, yellow poplar, and sweetgum. It has no major limitations for normal forestry operations.

This soil has severe limitations for most urban uses. Low strength, as it affects streets and local roads, the seasonal wetness, and the shrink-swell properties are the major limitations. Proper design and careful installation can help offset these limitations. The slow permeability in the fragipan and the wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Dulac soil is in capability subclass IVe. The woodland ordination symbol is 8A.

3D3—Dulac silt loam, 8 to 12 percent slopes, severely eroded. This soil is strongly sloping and moderately well drained. It has a fragipan. This soil formed in a mantle of silty material overlying clayey material on ridgetops and hillsides of uplands.

In most areas of this soil, the original surface layer has been removed by erosion and the plow layer is subsoil. The surface layer is a mixture of topsoil and subsoil in some small areas. Rills and shallow gullies are common. Deep gullies have formed in a few areas. They cannot be crossed with farm machinery.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 2 inches; yellowish brown silt loam

Subsoil:
2 to 17 inches; strong brown silty clay loam
17 to 30 inches; brown silt loam fragipan that has mottles in shades of brown and gray
30 to 55 inches; yellowish red and red silty clay and clay that has mottles in shades of brown and gray
55 to 65 inches; mottled red, reddish yellow, and light brownish gray clay

Important soil properties:

Permeability: moderate in the upper part of the subsoil and slow in the fragipan

Available water capacity: moderate

Soil reaction: very strongly acid or strongly acid throughout except where lime has been added

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: perched above the fragipan at 1 foot to 2 feet below the surface in wet periods

Flooding: none

Root zone: shallow, fragipan restricts root growth at a depth of 1.5 to 2.5 feet

Tilth: soil tends to crust and pack; can be cultivated throughout a moderate range of moisture content

Included with this soil in mapping are small areas of soils that have a silty clay loam surface layer and small areas of soils where erosion has exposed the fragipan and underlying clayey subsoil. Also included are small areas of Providence and Loring soils. These soils are in upland positions similar to those of this Dulac soil.

This Dulac soil is mainly used for pasture or crops. A small acreage is used as woodland.

This soil is not suited to row crops, truck crops, and small grains because erosion is a severe hazard. Further loss by erosion is possible if cultivated crops are grown. These soils are better suited to a permanent cover of grasses and legumes or trees.

This soil is moderately suited to grasses and legumes for pasture or hay. The plants help slow runoff and control erosion. The main limitations are steepness of slope and shallow gullies. Smoothing rills and shaping gullies can make mowing and other production practices easier. Overgrazing or grazing when the soil is too wet can cause surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help keep the pasture and soil in good condition.

This soil is moderately suited to loblolly pine, shortleaf pine, Shumard oak, yellow poplar, and sweetgum. It has no major limitations for normal forestry operations.

This soil has severe limitations for most urban uses. Low strength as it affects streets and local roads, the shrink-swell potential, and the seasonal wetness are the major limitations. Proper design and careful installation can help offset these limitations. Steepness of slope is also a severe limitation for small commercial buildings. The slow permeability in the fragipan and the wetness are severe limitations for use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Dulac soil is in capability subclass VIe. The woodland ordination symbol is 8A.

4A—Grenada silt loam, 0 to 1 percent slopes. This soil is nearly level and is moderately well drained. It has a fragipan. This soil formed in silty material on upland ridges and stream terraces.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 4 inches; brown silt loam

Subsoil:
4 to 21 inches; yellowish brown silt loam that has pale brown mottles below a depth of about 17 inches
21 to 25 inches; light brownish gray silt and yellowish brown silt loam
25 to 50 inches; yellowish brown silt loam fragipan that has mottles in shades of brown and gray
50 to 70 inches; brown silt loam fragipan that has mottles in shades of brown and gray

Important soil properties:

Permeability: moderate in the upper part of the subsoil and slow in the fragipan

Available water capacity: moderate

Soil reaction: very strongly acid to medium acid in the surface layer and upper part of the subsoil except where lime has been added; strongly acid to neutral in the lower part of the subsoil

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: perched 1.5 feet to 2.5 feet below the surface in wet periods

Flooding: none

Root zone: moderately deep, the fragipan restricts root growth at a depth of 1.5 to 2.5 feet

Tilth: good, soil is easily tilled throughout a wide range of moisture content, but crusts and packs after hard rains

Included with this soil in mapping are small areas of Calloway and Loring soils. Calloway soils are lower on terraces than the Grenada soil, and Loring soils are in slightly higher upland positions. Also included are a few small areas of soils that have slopes of more than 1 percent. These areas are only a few feet wide, and they generally occur as a rim between the Grenada soil and lower-lying alluvial soils.

This Grenada soil is mainly used for crops or pasture. A small acreage is used as woodland.

This soil is well suited to row crops, truck crops, and small grains. Plant row alignment, grassed waterways, and surface field ditches can remove excess surface

water. Conservation tillage is recommended. Returning crop residue to the soil improves fertility, helps to maintain tilth, and reduces crusting and packing.

This soil is moderately suited to grasses and legumes for pasture or hay. Overgrazing or grazing when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help keep the pasture and soil in good condition.

This soil is moderately suited to cherrybark oak, loblolly pine, shortleaf pine, southern red oak, Shumard oak, white oak, sweetgum, and water oak. It has no major limitations for normal forestry operations.

This soil has moderate limitations for most urban uses. Seasonal wetness is a major limitation. Low strength of this soil is a severe limitation for streets and local roads, and wetness is a severe limitation for dwellings with basements. Proper design and careful installation help offset these limitations. Wetness and the slow permeability in the fragipan are severe limitations for septic tank absorption fields, but these limitations can be partly overcome by increasing the size of the absorption field.

This Grenada soil is in capability subclass IIw. The woodland ordination symbol is 8A.

4B—Grenada silt loam, 1 to 3 percent slopes. This soil is gently sloping and moderately well drained. It has a fragipan. This soil formed in silty material on upland ridgetops and stream terraces.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 4 inches; yellowish brown silt loam

Subsoil:
4 to 18 inches; dark yellowish brown silt loam
18 to 23 inches; dark yellowish brown silt loam that has mottles in shades of brown
23 to 27 inches; light gray silt loam that has brownish mottles
27 to 60 inches; dark brown silt loam fragipan that has mottles in shades of gray and brown

Important soil properties:

Permeability: moderate in the upper part of the subsoil and slow in the fragipan

Available water capacity: moderate

Soil reaction: very strongly acid to medium acid in the surface layer and upper part of the subsoil except where lime has been added; strongly acid to neutral in the lower part of the subsoil

Surface runoff: medium

Erosion hazard: moderate

Seasonal high water table: perched above the fragipan 1.5 to 2.5 feet below the surface in wet periods

Flooding: none

Root zone: moderately deep, the fragipan restricts root growth at a depth of 1.5 to 2.5 feet

Tilth: good, soil can be tilled throughout a wide range of moisture content, but crusts and packs after hard rains

Included with this soil in mapping are small areas of Calloway and Loring soils. Calloway soils are lower on terraces than Grenada soil, and Loring soils are in slightly higher upland positions.

This Grenada soil is mainly used for crops or pasture. A small acreage is used as woodland.

This soil is well suited to row crops, truck crops, and small grains. Conservation tillage, contour farming, crop rotation, terraces, and grassed waterways slow runoff and help control erosion. Returning crop residue to the soil improves fertility, helps to maintain tilth, and reduces crusting and packing.

This soil is moderately suited to pasture or hay. The plants help slow runoff and control erosion. Overgrazing or grazing when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help keep the pasture and soil in good condition.

This soil is moderately suited to cherrybark oak, southern red oak, Shumard oak, loblolly pine, shortleaf pine, sweetgum, water oak, and white oak. It has no major limitations for normal forestry operations.

This soil has moderate limitations for most urban uses. Low strength is a severe limitation for streets and local roads, and wetness is a severe limitation for dwellings with basements. Proper design and careful installation help offset these limitations. Wetness and the slow permeability in the fragipan are severe limitations for septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Grenada soil is in capability subclass IIe. The woodland ordination symbol is 8A.

5B2—Loring silt loam, 2 to 5 percent slopes, eroded. This soil is gently sloping and moderately well drained. It has a fragipan. This soil formed in silty material on ridgetops of uplands.

In most areas of this soil, part of the original surface layer has been removed by erosion and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil. In other areas,

the plow layer is mainly subsoil. Some areas of this soil have a few rills and shallow gullies.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 6 inches; dark yellowish brown silt loam

Subsoil:
6 to 18 inches; strong brown silty clay loam
18 to 31 inches; strong brown silt loam that has grayish and brownish mottles
31 to 47 inches; strong brown silt loam fragipan that has mottles in shades of gray and brown
47 to 65 inches; yellowish brown silt loam fragipan that has mottles in shades of gray and brown

Important soil properties:

Permeability: moderate in the upper part of the subsoil and slow in the fragipan

Available water capacity: moderate

Soil reaction: very strongly acid to medium acid in the surface layer and subsoil except where lime has been added; very strongly acid to slightly acid in the substratum

Surface runoff: medium

Erosion hazard: moderate

Seasonal high water table: perched above the fragipan at 2 to 3 feet below the surface in wet periods

Flooding: none

Root zone: moderately deep, fragipan restricts root growth at a depth of 1.5 to 3 feet

Tilth: good, soil is easily tilled throughout a wide range of moisture content, but crusts and packs after hard rains

Included in mapping are small areas of Grenada, Memphis, and Providence soils. These soils are intermingled across the landscape on uplands and terraces.

This Loring soil is mainly used for pasture or crops. A small acreage is used as woodland.

This soil is well suited to row crops, truck crops, and small grains. Conservation tillage, contour farming, crop rotation, terraces, and grassed waterways slow runoff and help control erosion. Returning crop residue to the soil improves soil fertility, helps to maintain tilth, and reduces crusting and packing.

This soil is moderately suited to pasture or hay. The plants help slow runoff and control erosion. Overgrazing or grazing when the soil is too wet, however, causes surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help keep the pasture and soil in good condition.

This soil is moderately suited to cherrybark oak, loblolly pine, yellow poplar, southern red oak, shortleaf pine, sweetgum, and water oak. It has no major limitations for normal forestry operations.

This soil has moderate limitations for most urban uses. Seasonal wetness is a severe limitation for dwellings with basements, and low strength is a severe limitation for streets and local roads. Proper design and careful installation help offset these limitations. The slow permeability in the fragipan and wetness are severe limitations for septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Loring soil is in capability subclass IIe. The woodland ordination symbol is 9A.

5C2—Loring silt loam, 5 to 8 percent slopes, eroded. This soil is sloping and moderately well drained. It has a fragipan. This soil formed in silty material on ridgetops and hillsides of uplands.

In most areas of this soil, part of the original surface layer has been removed by erosion and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil. In other areas, the plow layer is mainly the subsoil material. Some areas of this soil have a few rills and shallow gullies.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 5 inches; dark brown silt loam

Subsoil:
5 to 9 inches; brown silt loam
9 to 24 inches; brown silty clay loam
24 to 42 inches; brown silt loam fragipan that has mottles in shades of brown and gray
42 to 48 inches; brown and dark yellowish brown silt loam fragipan that has mottles in shades of gray

Substratum:
48 to 65 inches; brown silt loam that has brownish and grayish mottles

Important soil properties:

Permeability: moderate in the upper part of the subsoil and slow in the fragipan

Available water capacity: moderate

Soil reaction: very strongly acid to medium acid in the surface layer and subsoil except where lime has

been added; very strongly acid to slightly acid in the substratum

Surface runoff: medium to rapid

Erosion hazard: moderate

Seasonal high water table: perched above the fragipan at 2 to 3 feet below the surface in wet periods

Flooding: none

Root zone: moderately deep, fragipan restricts root growth at a depth of 1.5 to 3 feet

Tilth: good, easily tilled throughout a wide range of moisture content, but crusts and packs after hard rains

Included with this soil in mapping are small areas of Providence and Memphis soils on uplands. Also included are a few small areas of soils that are severely eroded.

This Loring soil is mainly used for pasture or crops. The remaining acreage is used as woodland.

This soil is moderately suited to row crops, truck crops, and small grains. Runoff and the hazard of erosion are increased if row crops are grown. Conservation tillage, contour farming, contour stripcropping, terraces, grassed waterways, and cropping systems that include rotations of grasses and legumes slow runoff and help control erosion. Returning crop residue to the soil improves fertility, helps to maintain tilth, and reduces soil crusting and packing.

This soil is moderately suited to grasses and legumes for pasture or hay. The plants slow runoff and help control erosion. Overgrazing or grazing when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help keep the pasture and soil in good condition. In a few places, smoothing and shaping of rills and gullies is needed.

This soil is moderately suited to cherrybark oak, loblolly pine, yellow poplar, southern red oak, shortleaf pine, sweetgum, and water oak. It has no major limitations for normal forestry operations.

This soil has moderate limitations for most urban uses. Seasonal wetness is a severe limitation for dwellings with basements, and low strength is a severe limitation for streets and local roads. Steepness of slope is a moderate limitation for small commercial buildings. Proper design and careful installation help offset these limitations. Wetness and the slow permeability in the fragipan are severe limitations for septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Loring soil is in capability subclass IIIe. The woodland ordination symbol is 9A.

5C3—Loring silt loam, 5 to 8 percent slopes, severely eroded. This soil is sloping and moderately well drained. It has a fragipan. This soil formed in silty material on ridgetops and hillsides of uplands.

In most areas of this soil, the original surface layer has been removed by erosion and the plow layer is subsoil material. The surface layer is a mixture of topsoil and subsoil in some small areas. Rills and shallow gullies are common. Deep gullies have formed in a few areas. They cannot be crossed with farm machinery.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:

0 to 3 inches; yellowish brown silt loam

Subsoil:

3 to 11 inches; strong brown silty clay loam

11 to 17 inches; strong brown silt loam that has pale brown mottles

17 to 27 inches; dark yellowish brown silt loam fragipan that has mottles in shades of gray and brown

27 to 55 inches; dark brown silt loam fragipan that has mottles in shades of gray and brown

55 to 62 inches; silt loam fragipan mottled in shades of brown and gray

Important soil properties:

Permeability: moderate in the upper part of the subsoil and slow in the fragipan

Available water capacity: moderate

Soil reaction: very strongly acid to medium acid in the surface layer and subsoil except where lime has been added; very strongly acid to slightly acid in the substratum

Surface runoff: medium to rapid

Erosion hazard: severe

Seasonal high water table: perched above the fragipan at less than 1.5 to 3 feet below the surface in wet periods

Flooding: none

Root zone: moderately deep, fragipan restricts root growth at a depth of 1.5 to 3 feet

Included with this soil in mapping are small areas of Providence and Memphis soils on uplands.

This Loring soil is mainly used for pasture or crops. A small acreage is used as woodland.

This soil is poorly suited to row crops, truck crops, and small grains because of the hazard of erosion. Further loss by erosion is possible if cultivated crops are grown. These soils are better suited to a permanent cover of grasses and legumes or trees. Conservation tillage, return of crop residue to the soil, crop rotation, contour stripcropping, contour farming, and terraces and grassed waterways are recommended if this soil is cultivated.

This soil is moderately suited to grasses and legumes for pasture or hay. The plants help slow runoff and control erosion. Smoothing and shaping of gullies is needed in a few places. Overgrazing or grazing when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help keep the pasture and soil in good condition.

This soil is moderately suited to cherrybark oak, loblolly pine, yellow poplar, southern red oak, shortleaf pine, sweetgum, and water oak. It has no major limitations for normal forestry operations.

This soil has moderate limitations for most urban uses. Seasonal wetness is a severe limitation for dwellings with basements, and low strength of this soil is a severe limitation for streets and local roads. Steepness of slope is a moderate limitation for small commercial buildings. Proper design and careful installation help offset these limitations. Wetness and the slow permeability in the fragipan are severe limitations for septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field.

This Loring soil is in capability subclass IVe. The woodland ordination symbol is 9A.

5D3—Loring silt loam, 8 to 12 percent slopes, severely eroded. This soil is strongly sloping and moderately well drained. It has a fragipan. This soil formed in silty material on ridgetops and hillsides of uplands.

In most areas of this soil, the original surface layer has been removed by erosion and the plow layer is subsoil material. The surface layer is a mixture of topsoil and subsoil in some small areas. Rills and shallow gullies are common. Deep gullies have formed in a few areas. They cannot be crossed with farm machinery.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 3 inches; dark brown silt loam

Subsoil:
3 to 24 inches; dark brown silt loam
24 to 48 inches; dark brown silt loam fragipan that has mottles in shades of gray and brown

Substratum:
48 to 60 inches; dark brown silt loam that has grayish mottles

Important soil properties:

Permeability: moderate in the upper part of the subsoil and slow in the fragipan

Available water capacity: moderate

Soil reaction: very strongly acid to medium acid in the surface layer and subsoil except where lime has been added; very strongly acid to slightly acid in the substratum

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: perched above the fragipan at 1.5 to 3 feet below the surface in wet periods

Flooding: none

Root zone: moderately deep, fragipan restricts root growth at a depth of 1.5 to 3 feet

Included in mapping are small areas of Memphis and Providence soils in upland positions similar to those of this Loring soil. Also included are small areas of soils that are not severely eroded.

This Loring soil is mainly used for pasture or crops. A small acreage is used as woodland.

This soil is not suited to row crops, truck crops, and small grains because of the severe hazard of erosion. Further loss of soil by erosion is possible if cultivated crops are grown. These soils are better suited to a permanent cover of grasses and legumes or trees.

This soil is poorly suited to grasses and legumes for pasture or hay; however, a plant cover helps slow runoff and control erosion. The main limitations are steepness of slope and shallow gullies. Smoothing and shaping of gullies is needed in a few places. Overgrazing or grazing when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help keep the pasture and soil in good condition.

This soil is moderately suited to cherrybark oak, loblolly pine, yellow poplar, southern red oak, shortleaf pine, sweetgum, and water oak. It has no major limitations for normal forestry operations.

This soil has moderate limitations for most urban uses. Low strength as it affects streets and local roads, steepness of slope as it affects small commercial buildings, and seasonal wetness are the major limitations. Limitations are moderate for dwellings without basements. Proper design and careful installation help offset these limitations. Wetness and the slow permeability in the fragipan are severe limitations of this soil for use as septic tank absorption fields. These

limitations can be partly overcome by increasing the size of the absorption field.

This Loring soil is in capability subclass VIe. The woodland ordination symbol is 9A.

6A—Memphis silt loam, 0 to 2 percent slopes. This soil is nearly level and is well drained. It formed in silty material on uplands and terraces.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 4 inches; yellowish brown silt loam that has brownish mottles

Subsoil:
4 to 19 inches; dark brown silty clay loam
19 to 62 inches; dark brown silt loam that has pale brown silt coatings

Substratum:
62 to 90 inches; dark brown silt loam that has pale brown silt coatings

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, easily penetrated by roots to a depth of 60 inches or more

Tilth: good, soil is easily tilled throughout a wide range of moisture content, but crusts and packs after hard rains

Included with this soil in mapping are small areas of Grenada soils on uplands and terraces and Loring soils on uplands.

This Memphis soil is mostly used for crops or pasture. A very small acreage is used as woodland.

This soil is well suited to row crops, truck crops, and small grains. If cultivated crops are grown, plant row arrangement can remove surface water and conservation tillage helps to control erosion. Returning crop residue to the soil helps to maintain good tilth and reduces crusting.

This soil is well suited to grasses and legumes for hay or pasture. Proper stocking, controlled grazing, and weed and brush control help keep the pasture and soil in good condition. Restricted use during wet periods helps to avoid surface compaction, poor tilth, and excessive surface runoff.

This soil is well suited to cherrybark oak, loblolly pine, water oak, sweetgum, and yellow poplar. It has no major limitations for normal forestry operations.

This soil has slight limitations for most urban uses. Low strength is a severe limitation for local roads and streets. The limitation for use of this soil as septic tank absorption fields is slight.

This Memphis soil is in capability class I. The woodland ordination symbol is 9A.

6B2—Memphis silt loam, 2 to 5 percent slopes, eroded. This soil is gently sloping and well drained. It formed in silty material on uplands and terraces.

In most areas of this soil, part of the original surface layer has been removed by erosion and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil, and in other areas, the plow layer is mainly subsoil. Some areas have a few rills and shallow gullies.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 5 inches; dark yellowish brown silt loam that has fragments of dark brown silty clay loam

Subsoil:
5 to 28 inches; dark brown silty clay loam
28 to 72 inches; dark brown silt loam that has silt coatings on peds

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: moderate

Erosion hazard: moderate

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, easily penetrated by roots to a depth of 60 inches or more

Tilth: good, soil is easily tilled throughout a wide range of moisture conditions, but crusts and packs after hard rains

Included with this soil in mapping are small areas of Grenada soils on uplands and terraces and Loring soils on uplands. Also included are small areas of severely eroded soils that have a silty clay loam surface layer.

This Memphis soil is mostly used for crops or pasture. A small acreage is used as woodland.

This soil is well suited to row crops, truck crops, and small grains. Conservation tillage, contour farming, terraces, grassed waterways, and cropping systems that include rotations of grasses and legumes slow runoff and help control erosion. Returning crop residue to the soil helps to maintain fertility and good tilth and reduces crusting.

This soil is moderately suited to grasses and legumes for hay or pasture. Proper stocking, controlled grazing, and weed and brush control are needed. Restricted use during wet periods helps keep the pasture and soil in good condition.

This soil is well suited to cherrybark oak, loblolly pine, water oak, sweetgum, and yellow poplar. It has no major limitations for normal forestry operations.

This soil has slight limitations for most urban uses. The low strength of the soil is a severe limitation for local roads and streets. This soil has slight limitations for use as septic tank absorption fields.

The Memphis soil is in capability subclass IIe. The woodland ordination symbol is 9A.

6C2—Memphis silt loam, 5 to 8 percent slopes, eroded. This soil is sloping and well drained. It formed in silty material on uplands and terraces.

In most areas of this soil, part of the original surface layer has been removed by erosion and the tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil, and in others, the plow layer is mainly subsoil. A few rills and shallow gullies are in some areas.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 3 inches; dark brown silt loam

Subsurface layer:
3 to 7 inches; brown silt loam

Subsoil:
7 to 35 inches; dark brown silty clay loam that has pale brown silt coatings below a depth of about 21 inches
35 to 53 inches; dark brown silt loam that has pale brown silt coatings

Substratum:
53 to 60 inches; dark brown silt loam that has pale brown silt coatings

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: moderate to rapid

Erosion hazard: moderate

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, easily penetrated by plant roots to a depth of 60 inches or more

Tilth: good, soil is easily tilled throughout a wide range of moisture content, but crusts and packs after hard rains

Included with this soil in mapping are small areas of Loring soils on uplands. Also included on uplands are a few small areas of severely eroded soils.

This Memphis soil is used mainly for pasture or crops. In a few areas, it is used as woodland. This soil is moderately suited to row crops, truck crops, and small grains. The hazard of erosion and runoff are increased if row crops are grown. Conservation tillage, contour farming, contour stripcropping, terraces, grassed waterways, and cropping systems that include rotations of grasses and legumes slow runoff and help control erosion. Returning crop residue to the soil improves fertility, helps to maintain tilth, and reduces crusting and packing.

This soil is moderately suited to grasses and legumes for hay or pasture. The plant cover slows runoff and helps to control erosion. Smoothing and shaping of gullies are needed in a few places. Proper stocking, controlled grazing, weed and brush control, and restricted use during wet periods help keep the pasture and soil in good condition.

This Memphis soil is well suited to cherrybark oak, loblolly pine, water oak, sweetgum, and yellow poplar. It has no major limitations for normal forestry operations.

This soil has slight limitations for most urban uses and for use as septic tank absorption fields. Low strength is a severe limitation for local roads and streets, and steepness of slope is a moderate limitation for small commercial buildings.

This Memphis soil is in capability subclass IIIe. The woodland ordination symbol is 9A.

6C3—Memphis silt loam, 5 to 8 percent slopes, severely eroded. This soil is sloping and well drained. It formed in silty material on uplands and terraces.

In most areas of this soil, the original surface layer has been removed by erosion and the plow layer is subsoil. The surface layer is a mixture of topsoil and subsoil in some small areas. Rills and shallow gullies are common. Deep gullies have formed in a few areas. They cannot be crossed with farm machinery.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 2 inches; dark yellowish brown silt loam

Subsoil:
2 to 9 inches; dark brown silt loam
9 to 29 inches; dark brown silt loam that has pale brown mottles and silt coatings
29 to 59 inches; dark yellowish brown silt loam that has pale brown silt coatings
59 to 70 inches; yellowish brown silt loam that has pale brown silt coatings

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: moderate to rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, easily penetrated by plant roots to a depth of 60 inches or more

Tilth: surface crusts and packs after hard rains

Included with this soil in mapping are a few small areas of Loring soils on uplands. Also included on uplands are a few small areas of Memphis soils that are not as severely eroded.

This Memphis soil is mainly used for pasture or crops. A small acreage is used as woodland.

This soil is moderately suited to row crops, truck crops, and small grains. Erosion and runoff increase if row crops are grown. Conservation tillage, contour farming, terraces, grassed waterways, and cropping systems that include rotations of grasses and legumes slow runoff and help control erosion. Returning crop residue to the soil improves fertility, helps to maintain tilth, and reduces crusting and packing.

This soil is moderately suited to grasses and legumes for hay or pasture. The plant cover slows runoff and helps to control erosion. Smoothing and shaping of gullies are needed in a few places. Proper stocking, controlled grazing, and weed and brush control are needed. Restricted use during wet periods help keep the pasture and soil in good condition.

This soil is well suited to cherrybark oak, loblolly pine, water oak, sweetgum, and yellow poplar. It has no major limitations for normal forestry operations.

This soil has slight limitations for most urban uses. Low strength is a severe limitation for local roads and streets. Steepness of slope is a moderate limitation for small commercial buildings. This soil has slight limitations for use as septic tank absorption fields.

This Memphis soil is in capability subclass IIIe. The woodland ordination symbol is 9A.

6D3—Memphis silt loam, 8 to 12 percent slopes, severely eroded. This soil is strongly sloping and well drained. It formed in silty material on ridges and hillsides of uplands.

In most areas of this soil, the original surface layer has been removed by erosion and the plow layer is subsoil. The surface layer is a mixture of topsoil and subsoil in some small areas. Rills and shallow gullies are common (fig. 8). Deep gullies have formed in a few small areas. They cannot be crossed with farm machinery.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 2 inches; dark yellowish brown silt loam that has fragments of dark brown silty clay loam

Subsoil:
2 to 14 inches; dark brown silty clay loam
14 to 55 inches; dark brown silt loam that has pale brown silt coatings
55 to 70 inches; dark brown silt loam

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Figure 8.—Because rills and gullies form in Memphis silt loam, 8 to 12 percent slopes, severely eroded, this soil is best suited to a permanent plant cover.

Flooding: none

Root zone: deep, easily penetrated by plant roots to a depth of 60 inches or more

Included with this soil in mapping are a few small areas of Loring soils on uplands. Also included on uplands are a few small areas of Memphis soil that is only moderately eroded.

This Memphis soil is mostly used as pasture. A small acreage is used as woodland or cropland.

This soil is not suited to row crops, truck crops, and small grains because of the severe hazard of erosion, rapid runoff, and steepness of slope. It is better suited to a permanent cover of grasses and legumes or trees.

This soil is moderately suited to grasses and legumes for hay or pasture. The pasture plants effectively help to control erosion. Smoothing and shaping gullies make mowing and other production practices easier. Overgrazing causes excessive runoff and increases the hazard of erosion. Proper stocking, controlled grazing, and weed and brush control slow runoff, help control erosion, and keep the soil and pasture in good condition.

This soil is well suited to cherrybark oak, loblolly pine, sweetgum, water oak, and yellow poplar. It has no major limitations for normal forestry operations.

This soil has moderate limitations for most urban uses because of steepness of slope. Low strength is a severe limitation for local roads and streets. Steepness of slope is a severe limitation for small commercial buildings. It is a moderate limitation for septic tank absorption fields. This limitation can be partly overcome by installing field lines on the contour.

This Memphis soil is in capability subclass VIe. The woodland ordination symbol is 9A.

6E3—Memphis silt loam, 12 to 40 percent slopes, severely eroded. This soil is moderately steep to steep and is well drained. It formed in silty material on hillsides of uplands.

In most areas of this soil, the original surface layer has been removed by erosion and the plow layer is subsoil. In some small areas, the surface layer is a mixture of original topsoil and the subsoil. Rills and shallow gullies are common. A few deep gullies have formed in places. They cannot be crossed with farm machinery.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 3 inches; dark brown silt loam

Subsoil:
3 to 16 inches; dark brown silty clay loam that has pale brown silt coatings
16 to 60 inches; dark brown silt loam that has pale brown silt coatings

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, easily penetrated by plant roots to a depth of 60 inches or more

Included with this soil in mapping are a few small areas of Loring soils on ridges and a few small areas of soils that are only moderately eroded. A few areas of Natchez and Lexington soils are on steep slopes, and a few small areas of Maben soils are on uplands.

This Memphis soil is mostly used as pasture or woodland.

This soil is not suited to row crops, truck crops, and small grains because of steepness of slope and the hazard of erosion. This soil is better suited to pine trees.

This soil is poorly suited to grasses and legumes for hay or pasture. Steepness of slope, rapid runoff, gullies that hinder the use of equipment, and low productivity resulting from erosion are the main limitations.

This soil is well suited to cherrybark oak, water oak, loblolly pine, sweetgum, and yellow poplar. Steepness of slope is a moderate to severe limitation for forest management operations, such as logging and site preparation. Because this soil is highly erodible, water bars, revegetation of disturbed areas, and layout of logging roads and skid trails to avoid steep grades are essential. Site preparation methods should leave a cover of mulch to prevent erosion. Drum chopping and approved herbicides are preferred to shearing and windrowing.

This soil has severe limitations for urban uses because of steepness of slope. Low strength is also a severe limitation for local roads and streets. Special design and careful installation can partly overcome this limitation. Steepness of slope is a severe limitation for use of this soil as septic tank absorption fields. This limitation can be partly overcome by installing field lines on the contour.

This Memphis soil is in capability subclass VIIe. The woodland ordination symbol is 9R.

6F2—Memphis silt loam, 15 to 40 percent slopes, eroded. This soil is moderately steep to steep and well drained. It formed in silty material on hillsides of uplands.

In some areas of this soil, part of the original surface layer has been removed by erosion and tillage has mixed the remaining topsoil and subsoil. In some small areas, all of the plow layer is the original topsoil. In other areas, the plow layer is mainly subsoil. Some areas have a few rills and shallow gullies, and a few deep gullies are scattered throughout some areas.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 3 inches; dark brown silt loam

Subsoil:
3 to 34 inches; dark brown silty clay loam
34 to 53 inches; dark brown silt loam
53 to 60 inches; yellowish brown silt loam

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, easily penetrated by plant roots to a depth of 60 inches or more

Included with this soil in mapping are a few small areas of Loring soils on uplands and areas of soils that are severely eroded. Also included are a few small areas of Natchez soils on the steeper slopes and Saffell soils along the bluff adjacent to the delta.

This Memphis soil is mainly used as pasture or woodland. A small acreage is used for crops.

This soil is not suited to row crops, truck crops, and small grains because of steepness of slope and the erosion hazard. This soil is better suited to a permanent cover of grasses and legumes or trees.

Where slopes are less than about 17 percent, this soil is moderately suited to grasses and legumes for hay or pasture. The plants can effectively control erosion. Overgrazing increases the erosion hazard, runoff, and surface compaction. Proper stocking, controlled grazing, and weed and brush control help control erosion, slow runoff, and help keep the soil and pasture in good condition. On slopes of more than 17 percent, this soil is better suited to trees.

This soil is well suited to cherrybark oak, sweetgum, loblolly pine, water oak, and yellow poplar. Steepness of slope is a moderate to severe limitation for management operations, such as logging and site preparation. Water bars, revegetation of disturbed areas, and layout of logging roads and skid trails to avoid steep grades are essential because this soil is highly erodible. Site preparation methods should leave a cover of mulch to prevent erosion. Drum chopping and approved herbicides are preferred to shearing and windrowing.

Steepness of slope is a severe limitation for most urban uses, and low strength is a severe limitation for local roads and streets. These limitations can be partly overcome by special design and careful installation. Steepness of slope is also a severe limitation for septic tank absorption fields. This limitation can be partly overcome by installing field lines on the contour.

This Memphis soil is in capability subclass VIe. The woodland ordination symbol is 9R.

7F—Memphis-Natchez association, hilly. This association consists of soils that are well drained. These soils are on narrow, winding ridgetops segregated by steep hillsides that border flat, narrow drainageways. They formed in silty material. These soils are in a regular and repeating pattern in a band a few miles wide along the bluff line adjacent to the delta. Memphis soils are on ridgetops and the upper part of hillsides. Natchez soils are on steeper middle and lower parts of hillsides. Individual areas of each soil are large enough to map separately, but because of similar present and expected uses, they were mapped as one unit. Areas of these soils range from 160 to more than 1,000 acres. Slopes range from 17 to 45 percent.

Memphis soil makes up about 52 percent of the map unit. Slopes range from about 12 to 40 percent. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 4 inches; dark grayish brown silt loam

Subsurface layer:
4 to 6 inches; yellowish brown silt loam

Subsoil:
6 to 22 inches; dark brown silty clay loam
22 to 66 inches; dark brown silt loam that has pale brown silt coatings

Important properties of the Memphis soil:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, easily penetrated by roots to a depth of 60 inches or more

Natchez soil makes up about 32 percent of the map unit. Slopes range from 17 to 45 percent. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 4 inches; dark grayish brown silt loam

Subsurface layer:
4 to 6 inches; yellowish brown silt loam

Subsoil:
6 to 24 inches; dark yellowish brown silt loam

Substratum:
24 to 60 inches; yellowish brown silt

Important properties of the Natchez soil:

Permeability: moderate

Available water capacity: high

Soil reaction: strongly acid to neutral in the surface and subsurface layers and the subsoil; neutral to moderately alkaline in the substratum

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, easily penetrated by roots to a depth of 60 inches or more

Included with this association in mapping are small areas of Loring soils on upland ridgetops; a few areas of sandy, clayey, or gravelly soils on steep hillsides; and a few small areas of Adler and Morganfield soils on narrow flood plains. The included soils make up about 16 percent of the association.

The soils in this association are mainly used as woodland.

These soils are not suited to truck crops, small grains, or row crops because of the steep slopes, rapid runoff, and severe hazard of erosion. These soils should be kept in a permanent plant cover to control erosion (fig. 9).

The soils of this association are poorly suited to grasses and legumes for hay or pasture. The steepness of slope hinders equipment and contributes to rapid runoff, soil erosion, and low productivity.

The Memphis soil in this association is well suited to cherrybark oak, sweetgum, loblolly pine, water oak, and yellow poplar. In addition, the Natchez soil is well suited to eastern cottonwood. The steep slopes are a moderate to severe limitation for forest management operations, such as logging and site preparation. Water bars, revegetation of disturbed areas, and layout of logging roads and skid trails to avoid steep grades are essential

Figure 9.—Crimson clover on roadbanks helps to control erosion on soils of the Memphis-Natchez association, hilly.

because these soils are highly erodible. Site preparation methods should leave a cover of mulch to prevent erosion. Drum chopping and approved herbicides are preferred to shearing and windrowing.

The steep slopes are a severe limitation for most urban uses. On Memphis soil, low strength is a severe limitation for local roads and streets. The steepness of slope is a severe limitation on Memphis and Natchez soils for septic tank absorption fields. This limitation can be partly overcome by installing field lines on the contour.

Memphis and Natchez soils are in capability subclass VIe. The woodland ordination symbol is 9R for the Memphis soil and 10R for the Natchez soil.

8C3—Providence silt loam, 5 to 8 percent slopes, severely eroded. This soil is sloping and moderately well drained. It has a fragipan. This soil formed in a mantle of silty material underlain by loamy material. It is on ridgetops and hillsides of uplands.

In most areas of this soil, the original surface layer has been removed by erosion and the plow layer is subsoil. The surface layer is a mixture of topsoil and subsoil in some small areas. Rills and shallow gullies are common. Deep gullies have formed in a few areas. They cannot be crossed with farm machinery.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 2 inches; dark brown silt loam that has fragments of strong brown silty clay loam

Subsoil:
2 to 18 inches; strong brown silty clay loam that has pale brown mottles
18 to 36 inches; strong brown silt loam fragipan that has mottles in shades of brown and gray
36 to 45 inches; strong brown silt loam fragipan that has mottles in shades of gray
45 to 60 inches; strong brown loam fragipan that has mottles in shades of gray and brown

Important soil properties:

Permeability: moderate in the upper part of the subsoil and moderately slow through the fragipan

Available water capacity: moderate

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: medium to rapid

Erosion hazard: severe

Seasonal high water table: perched above the fragipan at 1.5 to 3 feet below the surface in wet periods

Flooding: none

Root zone: fragipan restricts roots at a depth of 1.5 to 3 feet

Included with this soil in mapping are small areas of Loring soils on uplands.

This Providence soil is mainly used for pasture or crops. A small acreage is used as woodland.

This soil is poorly suited to row crops, truck crops, and small grains because of the hazard of erosion. Further loss by erosion is possible if cultivated crops are grown. This soil is better suited to a permanent cover of grasses and legumes or trees. Conservation tillage, return of crop residue to the soil, crop rotation, contour stripcropping, contour farming, and terraces and grassed waterways are recommended if this soil is cultivated.

This soil is moderately suited to grasses and legumes for pasture or hay. The plants slow runoff and help control erosion. Smoothing and shaping of gullies is needed in a few places. Overgrazing or grazing when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help keep the pasture and soil in good condition.

This soil is moderately suited to cherrybark oak, loblolly pine, yellow poplar, southern red oak, shortleaf pine, sweetgum, and water oak. Wetness is a moderate to severe limitation for forest management operations, such as logging and reforestation. Logging operations should be restricted to seasonal dry periods late in summer and in fall. Logging on wet soil causes compaction and can reduce site productivity. Seedling mortality is high on these sites because of increased competition from undesirable vegetation. This problem can be overcome by using mechanical cultivation and approved herbicides and by increasing the planting rate.

This soil has moderate limitations for most urban uses. Seasonal wetness is a severe limitation for dwellings with basements, and low strength is a severe limitation for streets and local roads. Wetness and steepness of slope are moderate limitations for small commercial buildings. Proper design and careful installation help offset these limitations. Wetness is also a severe limitation for septic tank absorption fields, but it can be partly overcome by increasing the size of the absorption field.

This Providence soil is in capability subclass IVe. The woodland ordination symbol is 8W.

8D3—Providence silt loam, 8 to 12 percent slopes, severely eroded. This soil is strongly sloping and moderately well drained. It has a fragipan. This soil formed in a mantle of silty material underlain by loamy material. It is on ridgetops and hillsides of uplands.

In most areas of this soil, the original surface layer has been removed by erosion and the plow layer is subsoil.

The surface layer is a mixture of topsoil and subsoil in some small areas. Rills and shallow gullies are common. Deep gullies have formed in a few areas. They cannot be crossed with farm machinery.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 3 inches; dark yellowish brown silt loam

Subsoil:
3 to 15 inches; dark brown silty clay loam
15 to 21 inches; strong brown silt loam that has mottles in shades of brown
21 to 34 inches; strong brown silt loam fragipan that has mottles in shades of gray
34 to 42 inches; strong brown loam fragipan that has mottles in shades of brown
42 to 65 inches; reddish brown sandy loam that has mottles in shades of gray

Important soil properties:

Permeability: moderate in the upper part of the subsoil and moderately slow in the fragipan

Available water capacity: moderate

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: perched above the fragipan at 1.5 to 3 feet below the surface in wet periods

Flooding: none

Root zone: fragipan restricts roots at a depth of 1.5 to 3 feet

Included with this soil in mapping are a few small areas of Loring soils in upland positions similar to those of this Providence soil. Also included are small areas of soils that are not as severely eroded and small areas of soils that have slopes of more than 12 percent. The included soils make up about 25 percent of the map unit.

This Providence soil is used mainly for pasture or crops. A small acreage is used as woodland. This soil is not suited to row crops, truck crops, and small grains because of the severe hazard of erosion. Further loss by erosion is possible if cultivated crops are grown. This soil is suited to a permanent cover of grasses and legumes or trees.

This soil is moderately suited to grasses and legumes for pasture or hay. The plant cover slows runoff and helps to control erosion. The main limitations are steepness of slopes and shallow gullies. Smoothing and shaping of gullies is needed in a few places. Overgrazing or grazing when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help keep the pasture and soil in good condition.

This soil is moderately suited to cherrybark oak, loblolly pine, yellow poplar, southern red oak, shortleaf pine, sweetgum, and water oak. Wetness is a moderate to severe limitation for forest management operations, such as logging and reforestation. Logging operations should be restricted to seasonal dry periods late in summer and in fall. Logging on wet soils causes compaction and can reduce site productivity. Seedling mortality is high on these sites because of increased competition from undesirable vegetation. This problem can be overcome by using mechanical cultivation and approved herbicides and by increasing the planting rate.

This soil has severe limitations for most urban uses. It has severe limitations for streets and local roads because of low strength, for small commercial buildings because of steepness of slope, and for dwellings with basements because of seasonal wetness. Wetness and steepness of slope are moderate limitations for dwellings without basements. Proper design and careful installation help offset these limitations. Wetness and steepness of slope are also severe limitations to the use of this soil as septic tank absorption fields. These limitations can be partly overcome by increasing the size of the absorption field and by installing field lines on the contour.

This Providence soil is in capability subclass VIe. The woodland ordination symbol is 8W.

9F—Smithdale-Providence-Lexington association, hilly. The soils of this association are in a regular and repeating pattern on narrow winding ridgetops, segregated by moderately steep to steep hillsides that border narrow drainageways. The Smithdale soil is moderately steep to steep and is well drained. It formed in loamy material on upland hillsides. Slopes range from 12 to 40 percent. The Providence soil is moderately steep and moderately well drained. It has a fragipan. This soil formed in a mantle of silty material and underlying loamy material. It is on upland ridges and hillsides that have slopes of 12 to 15 percent. The Lexington soil is moderately steep to steep and well drained. It formed in a mantle of silty material and underlying loamy material. Slopes range from 12 to 20 percent. Individual areas of each soil are large enough to map separately, but because of similar present and expected uses, these soils were mapped as one unit. Areas range from 160 to more than 1,000 acres.

The Smithdale soil makes up about 37 percent of the map unit. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 5 inches; dark grayish brown sandy loam

Subsurface layer:
5 to 12 inches; yellowish brown sandy loam

Subsoil:
12 to 26 inches; yellowish red sandy clay loam
26 to 48 inches; yellowish red sandy loam
48 to 80 inches; yellowish red sandy loam that has pockets of uncoated sand

Important properties of the Smithdale soil:

Permeability: moderate

Available water capacity: moderate

Soil reaction: very strongly acid or strongly acid except where lime has been added

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, easily penetrated by roots to a depth of 60 inches or more

The Providence soil makes up about 27 percent of the map unit. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 5 inches; dark grayish brown silt loam

Subsoil:
5 to 20 inches; strong brown silty clay loam
20 to 29 inches; strong brown silt loam fragipan that has light brownish gray mottles
29 to 44 inches; dark brown loam fragipan that has grayish mottles
44 to 65 inches; strong brown loam fragipan that has grayish mottles

Important properties of the Providence soil:

Permeability: moderate in the upper part of the subsoil and moderately slow in the fragipan

Available water capacity: moderate

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: perched 1.5 to 3 feet below the surface in wet periods

Flooding: none

Root zone: the fragipan restricts roots at a depth of 1.5 to 3 feet

The Lexington soil makes up about 17 percent of the map unit. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 2 inches; dark grayish brown silt loam

Subsurface layer:
2 to 4 inches; dark brown silt loam

Subsoil:
4 to 25 inches; dark brown silty clay loam that has brownish mottles in the upper part
25 to 35 inches; dark brown silt loam that has pale brown mottles
35 to 53 inches; dark brown loam that has pale brown silt coatings
53 to 70 inches; dark brown sandy loam that has pale brown coatings

Important properties of the Lexington soil:

Permeability: moderate in the upper part of the subsoil and moderately rapid in the lower part

Available water capacity: high

Soil reaction: very strongly acid to medium acid

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, easily penetrated by roots to a depth of 60 inches or more

Included with this association in mapping are small areas of Adler, Bruno, and Oaklimeter soils on narrow flood plains. Also included are small areas of red clayey soils on hillsides and gently sloping soils on ridgetops. A few gullies are on narrow ridgetops and hillsides. The included soils make up about 19 percent of the map unit.

The soils in this association are mainly used as woodland.

These soils are not suited to truck crops, small grains, or row crops because of steep slopes, rapid runoff, and the severe hazard of erosion. A permanent cover of grasses and legumes or trees is needed.

The soils of this association are poorly suited to grasses and legumes for hay and pasture. The steepness of slope hinders equipment and contributes to rapid runoff, soil erosion, and low productivity.

The Smithdale and Providence soils are moderately suited to loblolly pine, shortleaf pine, Shumard oak, and sweetgum. The Lexington soil is moderately suited to loblolly pine, shortleaf pine, sweetgum, cherrybark oak, Shumard oak, southern red oak, yellow poplar, shagbark hickory, black walnut, and black cherry. It has no major limitations for normal forestry operations. On Smithdale soil, the steepness of slope is a moderate to severe limitation for forest management operations, such as logging and site preparation. Water bars, revegetating disturbed areas, and layout of logging roads and skid trails to avoid steep grades are essential because the soils in this association are highly erodible. Site preparation methods should leave a cover of mulch to prevent erosion. Drum chopping and approved herbicides are preferred to shearing and windrowing. On Providence soil, wetness is a moderate to severe limitation for forest management operations. Logging operations should be restricted to seasonal dry periods late in summer and in fall. Logging on wet soils causes compaction and can reduce site productivity. Seedling mortality is high on these sites because of increased competition from undesirable vegetation. This problem can be overcome by using mechanical cultivation and approved herbicides, and by increasing the planting rate.

These soils have severe limitations for urban uses because of the steepness of slope. Wetness and steepness of slope of the Providence soil are moderate limitations for dwellings without basements. Steepness of slope is a severe limitation to the use of these soils for septic tank absorption fields. Wetness is an additional limitation of the Providence soil for this use. Increasing the size of the absorption field in wet areas and installing field lines on the contour can partly overcome these limitations.

The Smithdale soil is in capability subclass VIIe, and the Lexington and Providence soils are in capability subclass VIe. The woodland ordination symbol is 8R for Smithdale soil, 8W for Providence soil, and 9A for Lexington soil.

10E2—Smithdale sandy loam, 12 to 30 percent slopes, eroded. This soil is moderately steep to steep and well drained. It formed in loamy material on hillsides of uplands.

In most areas, part of the original surface layer has been removed by erosion and tillage has mixed the topsoil and subsoil. In places, all of the plow layer is the original topsoil, and in others, the plow layer is subsoil material. Some areas of this soil have a few rills and shallow gullies.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 3 inches; dark brown sandy loam

Subsurface layer:
3 to 8 inches; yellowish brown sandy loam

Subsoil:
8 to 21 inches; red sandy clay loam
21 to 63 inches; red sandy loam that has pockets of yellowish red loamy sand below a depth of about 45 inches
63 to 80 inches; red sandy loam that has pockets of red loamy sand and pale brown uncoated sand

Important soil properties:

Permeability: moderate

Available water capacity: moderate

Soil reaction: very strongly acid or strongly acid except where lime has been added

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, easily penetrated by plant roots to a depth of 60 inches or more

Included with this soil in mapping are a few small areas of Providence and Lexington soils on uplands.

This Smithdale soil is mainly used as pasture. A small acreage is used as woodland.

This soil is not suited to row crops because of steepness of slope, rapid runoff, and the severe hazard of erosion.

This soil is poorly suited to grasses and legumes for hay and pasture because of steepness of slope, the hazard of erosion, and low productivity.

This soil is moderately suited to loblolly pine and shortleaf pine. Steepness of slope is a moderate to severe limitation for forest management operations, such as logging and site preparation. Water bars, revegetation of disturbed areas, and layout of logging roads and skid trails to avoid steep grades are essential because this soil is highly erodible. Site preparation methods should leave a cover of mulch to prevent erosion. Drum

chopping and approved herbicides are preferred to shearing and windrowing.

This soil is severely limited for urban uses because of the steepness of slope. This limitation can be partly overcome by special design and careful installation. The slope is also a severe limitation for septic tank absorption fields, but this limitation can be partly overcome by installing field lines on the contour.

This Smithdale soil is in capability subclass VIIe. The woodland ordination symbol is 8R.

13—Bruno sandy loam, occasionally flooded. This soil is nearly level and is excessively drained. It formed in sandy alluvium on flood plains. It is on long, low, narrow ridges and round or oblong mounds or in small areas locally known as "sand blows." Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 8 inches; yellowish brown sandy loam that has mottles in shades of brown and gray

Underlying material:
8 to 70 inches; layers of sand, sandy loam, very fine sandy loam, loamy sand, and silt loam in shades of brown and gray

Important soil properties:

Permeability: rapid

Available water capacity: low

Soil reaction: strongly acid to mildly alkaline

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: within 4 to 6 feet of the surface in winter and early in spring

Flooding: occasional for brief periods late in winter and in spring before crops are planted

Root zone: deep, to a depth of 60 inches or more

Tilth: good, soil is easily worked throughout a wide range of moisture content

Included with this soil in mapping are small areas of Adler, Crevasse, and Oaklimeter soils. These soils are intermingled with Bruno soil on the flood plain. Also included are some areas of soils that are subject to flooding during the growing season.

This Bruno soil is mainly used for crops or pasture. A small acreage is used as woodland.

This soil is moderately suited to row crops, small grains, and truck crops. The soil warms early in spring and can be planted early, but it is droughty during dry summer months, which causes plants to be stressed by lack of water. The hazard of wind erosion is moderate to severe during spring if the surface is bare. Conservation tillage is recommended. Returning crop residue to the soil improves soil fertility, helps to maintain tilth, and reduces crusting and packing.

This soil is poorly suited to grasses and legumes for hay or pasture because of low productivity. Proper stocking, controlled grazing, and weed and brush control help keep the soil and pasture in better condition.

Bruno soil is well suited to cherrybark oak, river birch, sweetgum, yellow poplar, chestnut, willow oak, Shumard oak, and water oak. The sandy texture can cause droughty conditions that increase seedling mortality. To overcome this problem, increase the planting rate, control competing vegetation with approved herbicides, and maintain a cover of mulch to preserve soil moisture.

This soil has severe limitations for urban uses because of wetness and the hazard of flooding. Flooding and the coarse textured soil material, which does not filter effluent sufficiently, severely limit the use of this soil as septic tank absorption fields.

This Bruno soil is in capability subclass IIIs. The woodland ordination symbol is 9S.

14E—Maben-Memphis complex, 8 to 20 percent slopes. This complex consists of soils that are strongly sloping to steep and well drained. They are on uplands and are too intermingled to be mapped separately at the selected scale. The Maben soil formed in stratified marine sediment of loamy materials, clays, and shaly clays. The Memphis soil formed in thick beds of silty material. These soils are on all slope positions, but the Maben soil is generally on lower parts of hillsides and the Memphis soil is on upper parts. Areas of each soil range from about 30 to 300 acres.

The Maben soil and closely similar soils make up about 55 percent of the map unit. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 3 inches; dark brown silt loam

Subsoil:
3 to 22 inches; yellowish red clay that has brownish mottles
22 to 36 inches; clay mottled in shades of red and brown

Substratum:
36 to 60 inches; thinly stratified light brownish gray partly weathered shale and yellowish red fine sandy loam

Important soil properties of the Maben soil:

Permeability: moderately slow

Available water capacity: moderate

Soil reaction: medium acid or slightly acid in the surface layer except where lime has been added and very strongly acid to medium acid in the subsoil and underlying material

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: moderately deep; shale restricts root growth

The Memphis soil and closely similar soils make up about 20 percent of the map unit. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 4 inches; dark brown silt loam

Subsoil:
4 to 18 inches; dark brown silty clay loam
18 to 40 inches; dark brown silt loam that has pale brown mottles
40 to 60 inches; dark brown silt loam

Important properties of the Memphis soil:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, to a depth of 60 inches or more

Included with these soils in mapping are Smithdale and Providence soils. Smithdale soils are on middle and lower parts of upland hillsides, and Providence soils are on some upper parts of upland hillsides and ridgetops. Gullies are in a few areas. These included soils make up about 25 percent of the map unit.

About half the acreage of this complex is used for pasture and hay. The rest is used as woodland.

The soils of this complex are not suited to row crops, truck crops, and small grains because of the steepness of slope and the severe hazard of erosion. A permanent cover of grasses and legumes or trees is needed.

The Memphis soil is moderately suited to grasses and legumes for pasture and hay, and the Maben soil is poorly suited. The main limitation is steepness of slope. A plant cover slows runoff and helps to control erosion. Overgrazing or grazing when the soil is wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking, pasture rotation, deferred grazing, and weed and brush control help keep the pasture and soil in good condition.

The Maben soil is moderately suited to loblolly and shortleaf pines. It has a high clay content, and using heavy equipment can cause compaction. Excessive compaction reduces site productivity. Logging operations should be restricted to seasonal dry periods late in summer and in fall to minimize the potential for soil compaction. The Memphis soil is well suited to cherrybark oak, loblolly pine, sweetgum, and yellow poplar. It has no major limitations for normal forestry operations.

These soils have a severe limitation for many urban uses because of steepness of slope. The high shrink-swell potential of the Maben soil is a severe limitation for dwellings without basements. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has low shrink-swell potential. Slow permeability is a severe limitation to the use of Maben soil for septic tank absorption fields. This limitation is difficult to overcome.

This complex is in capability subclass VIe. The woodland ordination symbol is 8C for the Maben soil and 9A for the Memphis soil.

17—Chenneby-Arkabutla association, frequently flooded. This association consists of soils that are nearly level and are somewhat poorly drained. These soils formed in silty alluvium. They are in a regular and repeating pattern on flood plains of the Big Black River. Individual areas of each soil are large enough to map separately, but because of similar present and expected use, they were mapped as one unit. Areas of these soils are 160 to 1,000 acres. Slopes range from 0 to 2 percent.

Chenneby soil generally is nearer natural channels and is at a slightly higher elevation. It makes up about 55 percent of the map unit. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 5 inches; dark brown silt loam

Subsoil:

5 to 13 inches; dark brown silt loam that has mottles in shades of brown
13 to 52 inches; silt loam mottled in shades of brown and gray
52 to 65 inches; silty clay loam mottled in shades of brown and gray

Important properties of the Chenneby soil:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: 1 foot to 2.5 feet below the surface in winter and early in spring

Flooding: frequent, for brief periods in winter and early in spring

Root zone: deep, easily penetrated by plant roots

Tilth: good, but soil crusts and packs after hard rains

The Arkabutla soil is at a slightly lower elevation than the Chenneby soil and makes up about 36 percent of the map unit. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 3 inches; dark brown silt loam

Subsoil:
3 to 8 inches; dark yellowish brown silt loam that has grayish and brownish mottles
8 to 17 inches; mottled dark yellowish brown, dark brown, and gray silt loam
17 to 65 inches; gray silty clay loam that has mottles in shades of brown

Important properties of the Arkabutla soil:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid or strongly acid except where lime has been added

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: 1 to 1.5 feet below the surface in winter and early in spring

Flooding: frequent, for brief periods in winter and early in spring

Root zone: deep, easily penetrated by roots to a depth of 6 feet or more

Tilth: good, but soil tends to crust and pack after hard rains

Included with this association in mapping are areas of Oaklimeter and Bruno soils on flood plains and a few small areas of well drained, silty soils along remnants of old river terraces. Included with the Arkabutla soil are areas of a soil that has a neutral to alkaline reaction in the lower part of the subsoil. The included soils make up about 9 percent of the map unit.

Most of the acreage of this association is used as woodland. Small acreages are used for grasses and legumes for hay and pasture.

The Chenneby and Arkabutla soils are poorly suited to row crops because of frequent flooding. If crops are grown, conservation tillage and return of crop residue to the soil are recommended. Plant rows should be aligned to remove excess surface water. Field ditches are needed.

These soils are moderately suited to grasses and legumes for pasture and hay, however, grazing is limited during periods of high rainfall. Proper stocking, controlled grazing, and weed and brush control help keep the soil and pasture in good condition.

The Chenneby soil in this association is well suited to loblolly pine, sweetgum, water oak, yellow poplar, and American sycamore. The Arkabutla soil is well suited to cherrybark oak, eastern cottonwood, green ash, loblolly pine, Nuttall oak, sweetgum, American sycamore, and water oak. Wetness of these soils imposes moderate to severe limitations for forest management operations, such as logging and reforestation. Logging operations should be restricted to seasonal dry periods late in summer and in fall. Logging on wet soils causes compaction and can reduce site productivity. Seedling mortality is high on these sites because of the increased competition from undesirable vegetation. This problem can be overcome by using mechanical cultivation and approved herbicides and by increasing the planting rate.

These soils have severe limitations for urban uses because of wetness, the hazard of flooding, and low strength as it affects streets and roads. Flooding and wetness also severely limit the use of these soils as septic tank absorption fields.

Chenneby and Arkabutla soils are in capability subclass IVw. The woodland ordination symbol is 9W for the Chenneby soil and 12W for the Arkabutla soil.

19—Bruno-Tutwiler complex. The soils of this complex are nearly level and are gently sloping. They are on alluvial fans and aprons adjacent to the bluff hills and extending into the delta in the western part of the county. The Bruno soil is excessively drained, and the Tutwiler soil is well drained. Areas of the Bruno and Tutwiler soils are too intermingled to be mapped separately at the selected scale. The Bruno soil formed in sandy alluvium, and the Tutwiler soil formed in loamy alluvium on natural levees and terraces. Areas of these soils range from about 10 to 300 acres. Slopes range from 0 to 5 percent.

The Bruno soil makes up about 64 percent of the map unit. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 9 inches; dark grayish brown sandy loam

Underlying material:
9 to 60 inches; layers of sand, loamy sand, silt loam, and sandy loam in shades of brown

Important properties of the Bruno soil:

Permeability: rapid

Available water capacity: low

Soil reaction: strongly acid to mildly alkaline

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: within 4 to 6 feet of the surface in winter and early in spring

Flooding: rare

Root zone: deep, to a depth of 60 inches or more

Tilth: good, easily worked throughout a wide range of moisture content

Tutwiler soil makes up about 28 percent of the map unit. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 5 inches; dark grayish brown very fine sandy loam

Subsoil:
5 to 9 inches; dark brown silt loam
9 to 24 inches; dark yellowish brown silt loam
24 to 47 inches; dark brown silt loam

Substratum:
47 to 60 inches; dark brown fine sandy loam that has brownish mottles

Important properties of the Tutwiler soil:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, to a depth of 60 inches or more

Tilth: easy to keep in good tilth, soil can be cultivated throughout a wide range of moisture content

Included with these soils in mapping are some areas of soils that contain fine to coarse gravel, some Tutwiler soils that have a higher content of sand, and some soils that have sandy material at a depth of more than 48 inches. Also included are lower-lying areas of soils that are subject to occasional flooding. These soils make up about 8 percent of the map unit.

The soils of this complex are mainly used for crops or pasture. A small acreage is used as woodland.

Bruno soil is moderately suited to row crops, small grains, and truck crops. It is droughty during summer, which can cause plants to undergo moisture stress. Tutwiler soil is well suited to crops. Plant rows should be arranged and surface field ditches constructed to remove excess surface water. Returning crop residue to the soil improves soil fertility, helps to maintain tilth, and reduces crusting and packing. Contour farming, conservation tillage, and grassed waterways help control erosion.

The Bruno soil is poorly suited to grasses and legumes for hay and pasture because of low productivity. The Tutwiler soil is well suited. Proper stocking, controlled grazing, and weed and brush control help keep the soil and pasture in good condition.

The Bruno soil is well suited to river birch, sweetgum, yellow poplar, loblolly pine, American sycamore, eastern cottonwood, black willow, chestnut oak, cherrybark oak, willow oak, Shumard oak, and water oak. The sand in Bruno soil can cause droughty conditions that increase seedling mortality. To overcome this problem, increase the planting rate, control competing vegetation with approved herbicides, and maintain a cover of mulch to preserve soil moisture. Tutwiler soil is well suited to

cherrybark oak, water oak, eastern cottonwood, sweetgum, American sycamore, and yellow poplar. It has no major limitations for normal forestry operations.

The Bruno soil has severe limitations for urban uses because of the hazard of flooding. It has severe limitations for use as septic tank absorption fields because of poor filtration of effluent. The Tutwiler soil is well suited to most urban uses, and it has only slight limitations for use as septic tank absorption fields.

The Bruno soil is in capability subclass IIIs, and the Tutwiler soil is in capability subclass IIe. The woodland ordination symbol is 9S for the Bruno soil and 9A for the Tutwiler soil.

20—Alligator silty clay. This soil is level and poorly drained. It formed in clayey alluvium on flood plains on the delta. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 5 inches; dark gray silty clay

Subsoil:
5 to 41 inches; gray clay that has yellowish brown mottles
41 to 50 inches; gray silty clay that has yellowish brown mottles

Subsurface:
50 to 60 inches; gray silty clay loam that has yellowish brown mottles

Important soil properties:

Permeability: very slow

Available water capacity: high

Soil reaction: very strongly acid or strongly acid in the upper 40 inches except where lime has been added and slightly acid or neutral below a depth of 40 inches

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: fluctuates between 0.5 foot and 2 feet below the surface in winter and early in spring

Flooding: rare

Root zone: deep, to a depth of 60 inches or more

Tilth: surface layer is sticky when wet and hard when dry, and becomes cloddy if tilled when too wet or too dry

Included with this soil in mapping are a few small areas of Forestdale soils on slightly higher parts of natural levees and Sharkey soils in depressions and on flood plains. Also included are a few small areas of Alligator soil that has slopes of 2 to 3 percent.

This Alligator soil is mainly used for crops. A small acreage is used as woodland or pasture.

This soil is moderately suited to cultivated crops. The main limitations are wetness and the clayey texture. This soil is sticky when wet and hard when dry, and it becomes cloddy if tilled when too wet or too dry. Cracks form as the soil becomes dry (fig. 10). Proper row arrangement, surface field ditches, and grassed waterways are needed to remove excess surface water. Land smoothing improves surface drainage and permits more efficient use of farm equipment. Leaving crop residue on the surface helps maintain soil tilth and the organic matter content. Conservation tillage is recommended. Most crops, other than legumes, respond well to nitrogen fertilizer.

This soil is moderately suited to grasses and legumes for hay and pasture. The main limitations are poor trafficability caused by wetness and the clayey surface. Grazing when the soil is wet can compact the surface layer and damage the plants. Proper stocking, controlled grazing, pasture rotation, restricted grazing during wet periods, and weed and brush control help keep the pasture and the soil in good condition.

This soil is well suited to green ash, water oak, sweetgum, eastern cottonwood, American sycamore, and pecan. Wetness is a moderate to severe limitation for forest management operations, such as logging and reforestation. Logging operations should be restricted to seasonal dry periods late in summer and in fall. Logging on wet soils causes compaction and can reduce site productivity. Seedling mortality is high on these sites because of the increased competition from undesirable vegetation. This problem can be overcome by using mechanical cultivation and approved herbicides and by increasing the planting rate.

This soil is poorly suited to urban uses mainly because of wetness, shrink-swell properties of the subsoil, and the hazard of rare flooding. The effects of shrinking and swelling can be minimized by using proper designs and careful installation and by backfilling with nonexpansive fill material. Excess water can be removed by constructing shallow ditches and by providing the proper grade. Wetness and very slow permeability of the subsoil limit the use of this soil for septic tank absorption fields.

This Alligator soil is in capability subclass IIIw. The woodland ordination symbol is 8W.

21—Adler silt loam, occasionally flooded. This soil is nearly level and is moderately well drained. It formed in silty material on flood plains. Slopes range from 0 to 2 percent.

Figure 10.—Cracks form in Alligator silty clay as the soil dries.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 5 inches; dark brown silt loam

Underlying material:
5 to 37 inches; yellowish brown silt loam that has mottles in shades of brown and gray
37 to 60 inches; gray silt loam that has mottles in shades of gray and brown

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: medium acid to mildly alkaline throughout

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: fluctuates between 2 and 3 feet of the surface in wet periods in winter and early in spring

Flooding: occasional, for brief periods in winter and early in spring before crops are planted

Root zone: deep, to a depth of 60 inches or more

Tilth: soil is easy to keep in good tilth, but tends to crust

Included with this soil in mapping are small areas of Ariel and Morganfield soils. These soils are slightly higher on the flood plain than this Adler soil. A few small areas of a soil that is high in exchangeable sodium is

included in some delineations, and a few small areas of sandy soils are adjacent to streams.

This Adler soil is mainly used for crops or pasture. A small acreage is used as woodland.

This soil is well suited to row crops, small grains, and truck crops. Seasonal wetness and flooding are concerns in management; however, flooding seldom occurs during the growing season. Plant rows should be arranged and surface field ditches constructed to remove excess surface water. Returning crop residue to the soil improves fertility, helps to maintain tilth, and reduces crusting and packing. Seedbed preparation and cultivation are sometimes delayed in the spring because of wetness and flooding.

This soil is well suited to grasses and legumes for pasture or hay. Overgrazing or grazing when the soil is too wet, however, causes compaction and slow infiltration and results in poor tilth. Proper stocking, pasture rotation, weed and brush control, and restricted use during wet periods help keep the pasture and soil in good condition.

This soil is well suited to eastern cottonwood, willow oak, water oak, green ash, sweetgum, yellow poplar, and American sycamore. It has no major limitations for normal forestry operations.

This soil has severe limitations for urban uses mainly because of seasonal wetness and flooding. Flooding and wetness also severely limit the use of this soil as septic tank absorption fields.

This Adler soil is in capability subclass IIw. The woodland ordination symbol is 13A.

22—Arkabutla silt loam, frequently flooded. This soil is nearly level and is somewhat poorly drained. It formed in silty alluvium on broad flood plains. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:

0 to 5 inches; dark brown silt loam that has grayish mottles

Subsoil:

5 to 19 inches; dark brown silt loam that has brownish and grayish mottles

19 to 27 inches; light brownish gray silt loam that has brownish mottles

27 to 60 inches; gray silty clay loam that has brownish mottles

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid or strongly acid except where the surface layer has been limed

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: 1 to 1.5 feet below the surface in winter and early in spring

Flooding: frequent, for long periods in winter and early in spring

Root zone: deep, to a depth of 60 inches or more

Tilth: soil is friable and easily tilled throughout a fairly wide range of moisture, but crusts and packs after hard rains

Included with this soil in mapping are a few small areas of Chenneby, Falaya, and Oaklimeter soils on flood plains. Chenneby soils are at a slightly higher elevation along stream channels and former channels than the Arkabutla soil. Falaya and Oaklimeter soils are near the smaller tributary streams. A few small areas of soils that are slightly acid or neutral in the lower part of the subsoil are also included.

This Arkabutla soil is mainly used for crops or pasture. In a few areas, it is used as woodland.

This soil is poorly suited to row crops because of frequent flooding. Corn, cotton, soybeans, and small grains are common crops. Proper row arrangement and surface field ditches are needed to remove excess surface water. Conservation tillage and crop residue on the soil reduce crusting and improve tilth and fertility. Flooding damages crops in most years.

This soil is moderately suited to grasses and legumes for pasture or hay. Overgrazing or grazing when the soil is too wet causes surface compaction and poor tilth. Proper stocking, weed and brush control, and restricted grazing during wet weather help keep the pasture and the soil in good condition.

This soil is well suited to cherrybark oak, eastern cottonwood, green ash, loblolly pine, Nuttall oak, sweetgum, American sycamore, water oak, and eastern cottonwood. Wetness is a moderate to severe limitation for forest management operations, such as logging and reforestation. Logging operations should be restricted to seasonal dry periods late in summer and in fall. Logging on wet soils causes compaction and reduces site productivity. Seedling mortality is high on these sites because of the increased competition from undesirable vegetation. This limitation can be overcome by using mechanical cultivation and approved herbicides and by increasing the planting rate.

This soil is severely limited for urban uses because of flooding, wetness, and low strength as it affects local

roads and streets. Flooding and wetness also severely limit the use of this soil as septic tank absorption fields.

This Arkabutla soil is in capability subclass IVw. The woodland ordination symbol is 12W.

23—Chenneby silt loam, frequently flooded. This soil is nearly level and is somewhat poorly drained. It is mainly on flood plains of the Big Black River. It formed in silty alluvium. The areas of this soil are long, narrow bands along present and former river channels. Slopes are 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 6 inches; dark brown silt loam

Subsoil:
6 to 21 inches; dark brown silt loam that has mottles in shades of brown
21 to 29 inches; dark brown silty clay loam that has mottles in shades of gray
29 to 45 inches; yellowish brown silty clay loam that has mottles in shades of gray
45 to 65 inches; yellowish brown silt loam that has mottles in shades of gray and brown

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid to medium acid except where lime has been added

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: 1 to 2.5 feet below the surface in winter and early in spring

Flooding: frequent, for brief periods in winter and early in spring

Root zone: deep, easily penetrated by roots to a depth of 60 inches or more

Tilth: good, but soil crusts and packs after hard rains

Included with this soil in mapping are small areas of Arkabutla, Falaya, and Oaklimeter soils on the flood plains. Arkabutla soils are in slightly lower positions than those of the Chenneby soil, and Falaya and Oaklimeter soils are near tributary streams of the Big Black River. A few areas of soils that have a browner subsoil and are not as wet as the Chenneby soil are on old terraces.

This Chenneby soil is mainly used for crops or pasture.

This soil is poorly suited to row crops because of frequent flooding and wetness. Soybeans can be grown in some years when flooding is minor. If the soil is used for cultivated crops, a complete system of water management is needed. Conservation tillage, row arrangement, and surface field ditches are recommended. Return of crop residue to the soil improves fertility, reduces crusting, and increases water infiltration. Floods generally occur several times each year and can last for several weeks. They damage crops in most years.

This soil is moderately suited to grasses and legumes for pasture and hay (fig. 11). Winter forage plants are poorly suited because of the frequent flooding. Proper stocking, restricted use during wet periods, controlled grazing, and weed and brush control help keep the pasture and soil in good condition.

This soil is well suited to cherrybark oak, eastern cottonwood, water oak, yellow poplar, green ash, loblolly pine, sweetgum, and American sycamore. Wetness is a moderate to severe limitation for forest management operations, such as logging and reforestation. Logging operations should be restricted to seasonal dry periods late in summer and in fall. Logging on wet soil causes compaction and can reduce site productivity. Seedling mortality is high on these sites because of the increased competition from undesirable vegetation. This problem can be overcome by using mechanical cultivation and approved herbicides and by increasing the planting rate.

This soil has severe limitations for urban uses because of flooding, wetness, and low strength as it affects local roads and streets. It is severely limited for use as septic tank absorption fields because of wetness and flooding.

This Chenneby soil is in capability subclass IVw. The woodland ordination symbol is 9W.

24—Forestdale silt loam. This soil is nearly level and is poorly drained. It is on the lower part of natural levees bordering former stream channels on the delta. This soil formed in clayey and silty material. Slopes range from 0 to 2 percent, but are dominantly less than 1 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 6 inches; dark grayish brown silt loam

Subsoil:
6 to 34 inches; light brownish gray silty clay that has strong brown mottles
34 to 60 inches; gray silty clay loam that has strong brown mottles

Important soil properties:

Permeability: very slow

Figure 11.—In most years, flooding damages crops on Chenneby silt loam, frequently flooded.

Available water capacity: high

Soil reaction: very strongly acid to medium acid in the surface layer and upper part of the subsoil except where lime has been added; very strongly acid to mildly alkaline in the lower part of the subsoil and the substratum where present

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: 0.5 to 2 feet below the surface in winter and early in spring

Flooding: rare

Root zone: deep, to a depth of 60 inches or more

Tilth: soil is difficult to keep in good tilth, can be worked only within a narrow range of moisture content.

Included with this soil in mapping are a few small areas of the Alligator and Dundee soils. Alligator soils are slightly lower on flood plains than the Forestdale soil, and Dundee soils are slightly higher on natural levees. Also included are small areas of soils that have a silty clay loam surface layer and soils that are browner than is typical for the Forestdale soil. In some small areas adjacent to Alligator soils are soils that are underlain by clay. A few small areas that are subject to occasional flooding are also included.

This Forestdale soil is mainly used for crops. A small acreage is used as woodland or pasture.

This soil is moderately suited to cultivated crops. Wetness is the main limitation. This soil is difficult to keep in good tilth because it becomes cloddy if tilled when the soil is too wet or too dry. It can be worked only within a narrow range of moisture content. Proper alignment of plant rows and surface field ditches to remove excess water are needed for most cultivated crops and pasture plants. Land smoothing also improves surface drainage and permits efficient use of farm equipment. Using conservation tillage and returning all crop residue to the soil or regularly adding other organic matter improve fertility and help maintain soil tilth and

the content of organic matter. Crops respond well to lime and fertilizer.

This soil is moderately suited to grasses and legumes for hay and pasture. The main limitation is wetness. Proper stocking, pasture rotation, controlled grazing, weed and brush control, and restricted grazing during wet periods help keep the pasture and the soil in good condition.

This soil is moderately well suited to eastern cottonwood, cherrybark oak, Nuttall oak, willow oak, American sycamore, water oak, sweetgum, and green ash. Wetness is a moderate to severe limitation for forest management operations, such as logging and reforestation. Logging operations should be restricted to seasonal dry periods late in summer and in fall. Logging on wet soil causes compaction and can reduce site productivity. Seedling mortality is high on these sites because of the increased competition from undesirable vegetation. This problem can be overcome by using mechanical cultivation and approved herbicides and by increasing the planting rate.

This soil is poorly suited to urban uses because of rare flooding, high shrink-swell potential, wetness, and low strength as it affects local roads and streets. These problems can be partly overcome by careful design, proper installation, and an adequate depth of backfill with nonexpansive material. This soil has severe limitations for use as septic tank absorption fields because of wetness and very slow permeability of the subsoil.

This Forestdale soil is in capability class IIIw. The woodland ordination symbol is 9W.

25—Morganfield silt loam, occasionally flooded. This soil is nearly level and is well drained. It formed in silty alluvium on flood plains. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 6 inches; dark yellowish brown silt loam

Underlying material:
6 to 18 inches; dark yellowish brown silt loam that has brownish mottles
18 to 27 inches; dark brown silt loam that has brownish mottles
27 to 60 inches; dark brown silt loam

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: medium acid to mildly alkaline throughout

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: 3 to 4 feet below the surface in winter and early in spring

Flooding: occasional, for brief periods in winter and early in spring before crops are planted

Root zone: deep, easily penetrated by plant roots to a depth of 60 inches or more

Tilth: good, but soil tends to crust after hard rains

Included with this soil in mapping are small areas of Adler, Ariel, Oaklimeter, and Bruno soils. Adler soils are slightly lower on the flood plain than the Morganfield soil. Ariel and Oaklimeter soils are in positions similar to those of the Morganfield soil. Bruno soils are on flood plains near streams and levee breaks.

This Morganfield soil is mainly used for crops or pasture. A small acreage is used as woodland.

This soil is well suited to row crops, small grains, and truck crops. Flooding, wetness, and slow runoff in wet seasons are concerns in management; however, flooding rarely causes damage to crops during the growing season. Plant rows should be arranged and surface field ditches constructed to remove the excess surface water. Returning crop residue to the soil improves soil fertility, helps to maintain tilth, and reduces crusting. Preparing the seedbed and cultivating in spring are sometimes slightly delayed because of excess moisture.

This soil is well suited to grasses and legumes for pasture or hay. Overgrazing or grazing when the soil is too wet causes compaction, slows infiltration, and results in poor tilth. Proper stocking, pasture rotation, controlled grazing, and weed and brush control help keep the pasture and soil in good condition.

This soil is well suited to green ash, eastern cottonwood, yellow poplar, sweetgum, Nuttall oak, water oak, and American sycamore. It has no major limitations for normal forestry operations.

This soil has severe limitations for dwelling sites and other urban uses because of flooding. Flooding and wetness severely limit the use of this soil as septic tank absorption fields.

This Morganfield soil is in capability subclass IIw. The woodland ordination symbol is 13A.

26—Oaklimeter silt loam, occasionally flooded. This soil is nearly level and is moderately well drained. It formed in silty alluvium on flood plains. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:

0 to 7 inches; brown silt loam

Subsoil:
7 to 14 inches; dark yellowish brown silt loam
14 to 33 inches; dark brown silt loam that has mottles in shades of gray and brown
33 to 50 inches; silt loam mottled in shades of brown and gray
50 to 65 inches; silt loam mottled in shades of gray and brown

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid or strongly acid except where lime has been added

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: 1.5 to 2.5 feet below the surface in winter and early in spring

Flooding: occasional, for brief periods late in fall and early in spring before crops are planted

Root zone: deep, easily penetrated by plant roots to a depth of 60 inches or more

Tilth: good, but soil tends to crust and pack after hard rains

Included with this soil in mapping are a few small areas of Ariel and Falaya soils. The Ariel soils are well drained and are in higher positions than the Oaklimeter soil. Falaya soils are in lower positions on the flood plain. Also included are a few small areas of soils that are alkaline.

This Oaklimeter soil is mainly used for crops or pasture. A small acreage is used as woodland.

This soil is well suited to row crops, truck crops, and small grains. Flooding and seasonal wetness are concerns in management, but flooding rarely damages crops during the growing season. Plant rows should be arranged and surface field ditches constructed to remove excess surface water. Conservation tillage is recommended. Returning crop residue to the soil improves fertility, helps to maintain tilth, and reduces crusting.

This soil is well suited to grasses and legumes for hay or pasture. Overgrazing or grazing when the soil is too wet causes poor tilth and surface compaction. Proper stocking, controlled grazing, and weed and brush control help keep the soil and pasture in good tilth and reduce compaction.

This soil is well suited to cherrybark oak, eastern cottonwood, green ash, loblolly pine, Nuttall oak, willow oak, water oak, sweetgum, and yellow poplar. It has no major limitations for normal forestry operations.

This soil has severe limitations for urban uses because of wetness and flooding. Flooding and wetness also severely limit the use of this soil as septic tank absorption fields.

This Oaklimeter soil is in capability subclass IIw. The woodland ordination symbol is 10A.

27—Sharkey clay, frequently flooded. This soil is nearly level and is poorly drained. It is in depressions and on flood plains of the delta. This soil formed in clayey slack water sediment. Slopes are 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 4 inches; dark grayish brown clay that has brownish mottles

Subsoil:
4 to 16 inches; gray clay that has mottles in shades of brown
16 to 50 inches; gray clay that has mottles in shades of red

Substratum:
50 to 70 inches; gray clay that has mottles in shades of brown

Important soil properties:

Permeability: very slow

Available water capacity: high

Soil reaction: strongly acid to moderately alkaline in the surface layer except where lime has been added, medium acid to moderately alkaline in the subsoil, and neutral to moderately alkaline in the substratum

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: less than 2 feet below the surface in winter and spring

Flooding: frequent, for brief to long periods from winter to early in summer

Root zone: deep, to a depth of 60 inches or more

Tilth: soil is sticky when wet and hard when dry

Included with this soil in mapping are a few small areas of Forestdale soils on lower parts of natural

levees. Also included on flood plains are a few small areas of Sharkey soils that have slopes of 1 to 3 percent.

This Sharkey soil is mainly used for crops. A small acreage is used as woodland or pasture.

This soil is poorly suited to cultivated crops mainly because of flooding, wetness, and the clayey texture. This soil is sticky when wet and hard when dry, and it becomes cloddy if tilled when too wet or too dry. Proper arrangement of plant rows, surface field ditches, and grassed waterways are needed to remove excess surface water. Land smoothing improves surface drainage and permits efficient use of farm equipment. Leaving crop residue on the surface helps to maintain soil tilth and the organic matter content. Most crops, other than legumes, respond well to nitrogen fertilizer. Lime generally is not needed.

This soil is poorly suited to grasses and legumes for hay and pasture. The main limitations are wetness and the clayey surface. Grazing when the soil is wet can compact the surface layer and damage the plants. Proper stocking, controlled grazing, pasture rotation, weed and brush control, and restricted grazing during wet periods help keep the pasture and the soil in good condition.

This soil is moderately suited to baldcypress, green ash, water hickory, overcup oak, water oak, sweetgum, black willow, and pecan. Wetness is a moderate to severe limitation for forest management operations, such as logging and reforestation. Logging operations should be restricted to seasonal dry periods late in summer and in fall. Logging on wet soils causes compaction and can reduce site productivity. Seedling mortality is high on these sites because of the increased competition from undesirable vegetation. This problem can be overcome by using mechanical cultivation and approved herbicides and by increasing the planting rate.

This soil has severe limitations for urban uses because of wetness and the hazard of flooding. Low strength as it affects local roads and streets is also a severe limitation. Wetness and flooding also severely limit the use of this soil for septic tank absorption fields.

This Sharkey soil is in capability subclass Vw. The woodland ordination symbol is 6W.

28—Ariel silt, occasionally flooded. This soil is nearly level and is well drained. It formed in silty alluvium on flood plains. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 5 inches; dark brown silt

Subsoil:
5 to 15 inches; dark yellowish brown silt loam
15 to 40 inches; dark yellowish brown silt loam that has mottles in shades of brown
40 to 51 inches; mottled light brownish gray, dark yellowish brown, and yellowish brown silt
51 to 60 inches; mottled light brownish gray, dark yellowish brown, and yellowish brown silty clay loam

Important soil properties:

Permeability: moderately slow

Available water capacity: high

Soil reaction: very strongly acid or strongly acid except where lime has been added

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: 2.5 to 4 feet below the surface in winter and early in spring

Flooding: occasional, for brief periods in winter and early in spring before crops are planted

Root zone: deep, to a depth of 60 inches or more

Tilth: soil is easy to keep in good tilth, but tends to crust; a plowpan forms if the soil is tilled when wet

Included with this soil in mapping are a few small areas of Adler and Oaklimeter soils in slightly lower positions on flood plains than the Ariel soil.

This Ariel soil is mainly used for crops or pasture. A small acreage is used as woodland.

This soil is well suited to row crops, small grains, and truck crops. Seasonal wetness and flooding are concerns in management, however, flooding seldom occurs during the growing season. Plant rows should be arranged and surface field ditches constructed to remove excess surface water. Returning crop residue to the soil improves fertility, helps to maintain tilth, and reduces crusting and packing. Conservation tillage is recommended. Seedbed preparation and cultivation are sometimes delayed in the spring because of wetness and flooding.

This soil is well suited to grasses and legumes for pasture or hay. Overgrazing or grazing when the soil is too wet, however, causes compaction and slow infiltration and results in poor tilth. Proper stocking, controlled grazing, pasture rotation, weed and brush control, and restricted use during wet periods help keep the pasture and soil in good condition.

This soil is well suited to cherrybark oak, eastern cottonwood, water oak, yellow poplar, sweetgum, and loblolly pine. It has no major limitations for normal forestry operations.

This soil has severe limitations for urban uses mainly because of flooding and seasonal wetness. Flooding, wetness, and the moderately slow permeability in the lower part of the subsoil severely limit the use of this soil as septic tank absorption fields.

This Ariel soil is in capability subclass IIw. The woodland ordination symbol is 10A.

34E—Loring-Memphis association, rolling. This association consists of Loring and Memphis soils on uplands. The Loring soil is moderately well drained, and the Memphis soil is well drained. These soils formed in silty material. They are in a regular and repeating pattern on narrow ridgetops and broad hillsides that are dissected by numerous short drainageways. Individual areas of each soil are large enough to map separately, but because of similar present and expected uses, they were mapped as one unit. Areas of these soils are 160 to 500 acres. Slopes range from 12 to 20 percent.

The Loring soil generally is on ridgetops and the lesser hillsides. It makes up about 44 percent of the map unit. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 4 inches; dark yellowish brown silt loam

Subsoil:
4 to 20 inches; dark brown silt loam
20 to 45 inches; dark brown silt loam fragipan that has mottles in shades of brown and gray

Substratum:
45 to 60 inches; dark brown silt loam that has mottles in shades of gray and brown

Important properties of the Loring soil:

Permeability: moderate in the upper part of the subsoil and slow in the fragipan

Available water capacity: moderate

Soil reaction: very strongly acid to medium acid in the surface layer and subsoil and very strongly acid to slightly acid in the substratum

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: perched above the fragipan at 1.5 to 3 feet below the surface in wet periods

Flooding: none

Root zone: moderately deep, the fragipan restricts root growth at a depth of 1.5 to 3 feet

The Memphis soil is on some ridgetops but is mostly on steep hillsides. It makes up about 42 percent of the map unit. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 6 inches; dark yellowish brown silt loam

Subsoil:
6 to 25 inches; dark brown silty clay loam
25 to 60 inches; dark brown silt loam that has pale brown silt coatings below a depth of about 37 inches

Important properties of the Memphis soil:

Permeability: moderate

Available water capacity: high

Soil reaction: very strongly acid to medium acid

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, to a depth of 60 inches or more

Included with this association in mapping are a few small areas of Providence soils on upland ridgetops, Lexington and Natchez soils on steep hillsides, and Adler and Ariel soils on narrow flood plains. The included soils make up about 14 percent of the map unit.

The soils of this association are mainly used as woodland. A small acreage is used for grasses and legumes for hay and pasture.

These soils are not suited to row crops because of the steepness of slope, rapid runoff, and severe hazard of erosion.

Because of steepness of slope, the Loring soil is poorly suited to grasses and legumes for pasture or hay, and the Memphis soil is moderately suited. The plant cover slows runoff and helps to control erosion. Overgrazing or grazing when the soil is too wet causes surface compaction, excessive runoff, and poor tilth. Proper stocking, controlled grazing, pasture rotation, deferred grazing, and weed and brush control help keep the pasture and soil in good condition.

The Loring soil is moderately suited to cherrybark oak, loblolly pine, yellow poplar, southern red oak, shortleaf pine, sweetgum, and water oak. The Memphis soil is well suited to cherrybark oak, water oak, loblolly pine, sweetgum, and yellow poplar. These soils have no major limitations for normal forestry operations.

The Loring and Memphis soils have severe limitations for urban uses because of steepness of slope and low strength as it affects local roads and streets. Wetness is also a severe limitation on Loring soil. Steepness of slope and the slow permeability in the fragipan of the Loring soil are severe limitations for septic tank absorption fields. These limitations can be partly overcome by installing field lines on the contour and increasing the size of the absorption field.

The Loring and Memphis soils are in capability subclass VIe. The woodland ordination symbol is 9A for both soils.

43—Falaya silt, occasionally flooded. This soil is nearly level and is somewhat poorly drained. It formed in silty alluvium on flood plains. Slopes typically are 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:

0 to 6 inches; brown silt that has mottles in shades of brown

Underlying material:

6 to 15 inches; brown silt that has mottles in shades of gray and brown

15 to 28 inches; gray silt loam that has mottles in shades of brown

28 to 40 inches; gray silt loam that has mottles in shades of brown

40 to 54 inches; silt loam mottled in shades of gray and brown

54 to 65 inches; grayish brown silty clay loam that has mottles in shades of gray and brown

Important soil properties:

Permeability: moderate in the upper part of the subsoil and slow to moderate in the lower part

Available water capacity: high

Soil reaction: very strongly acid or strongly acid except where lime has been added

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: 1 to 2 feet below the surface in winter and early in spring

Flooding: occasional, for brief to long periods in winter and early in spring before crops are planted

Root zone: deep

Tilth: soil is fairly easy to keep in good tilth but tends to crust and pack; plowpan forms if the soil is tilled when wet but can be broken up by chiseling or subsoiling

Included with this soil in mapping are small areas of Arkabutla, Chenneby, and Oaklimeter soils on flood plains. Arkabutla and Chenneby soils are mostly in low spots in the southeastern part of the county. Oaklimeter soils are at a slightly higher elevation than the Falaya soil. Also included in low spots are a few small areas of poorly drained soils that have a neutral or alkaline subsoil. The included soils make up about 15 percent of the map unit.

This Falaya soil is mainly used as cropland or pasture. A small acreage is used as woodland.

This soil is well suited to row crops, truck crops, and small grains. Flooding occasionally damages crops during the growing season, and wetness is a limitation. Plant rows should be arranged and field ditches installed to remove excess surface water. Conservation tillage is recommended. Return of crop residue to the soil improves soil fertility, helps to maintain tilth, and reduces crusting.

This soil is well suited to grasses and legumes for hay and pasture. Overgrazing or grazing when the soil is too wet causes poor tilth and surface compaction. Proper stocking, controlled grazing, and weed and brush control help keep the soil in good condition.

This soil is well suited to cherrybark oak, eastern cottonwood, green ash, loblolly pine, Nuttall oak, willow oak, water oak, sweetgum, and yellow poplar. Wetness, however, is a moderate to severe limitation for forest management operations, such as logging and reforestation. Logging operations should be restricted to seasonal dry periods late in summer and in fall. Logging on wet soils causes compaction and can reduce site productivity. Seedling mortality is high on these sites because of the increased competition from undesirable vegetation. This problem can be overcome by using mechanical cultivation and approved herbicides and by increasing the planting rate.

This soil is poorly suited to urban uses because of wetness and the hazard of flooding. Flooding and wetness also severely limit the use of this soil as septic tank absorption fields.

This Falaya soil is in capability subclass IIw. The woodland ordination symbol is 11W.

46—Gullied land-Loring complex. This complex consists of small areas of gullies and Loring soil that are too intermingled to be mapped separately at the selected scale. The Loring soil is sloping to steep and moderately well drained. It has a fragipan. This soil formed in silty material on sloping to steep hillsides and narrow ridges on uplands. Slopes range from 5 to 20 percent. The areas of this soil are between deep, wide,

irregularly shaped gullies. The gullies formed in silty material. The areas of this map unit are irregular in shape and range from 15 to 300 acres. Slopes range from 5 to 25 percent.

The gullies make up about 57 percent of the map unit. Typically, they consist of soils that have been so severely eroded by water that soil horizons have been destroyed beyond recognition. The texture is variable. It is dominantly silty, but in the lower part of deep gullies, it ranges from loam to sandy clay loam.

The soil in the gullies ranges from very strongly acid to medium acid. Permeability is variable, and the available water capacity is low. Runoff is very rapid, and erosion is a very severe hazard.

The Loring soil makes up about 27 percent of the map unit. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 2 inches; brown silt loam

Subsoil:
2 to 18 inches; dark brown silty clay loam
18 to 60 inches; dark brown silt loam fragipan that has mottles in shades of gray and brown

Important properties of the Loring soil:

Permeability: moderate in the upper part of the subsoil and slow in the fragipan

Available water capacity: moderate

Soil reaction: very strongly acid to medium acid in the surface layer and subsoil; very strongly acid to slightly acid in the substratum, where present

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: perched above the fragipan at 2 to 3 feet below the surface in wet periods

Flooding: none

Root zone: fragipan restricts root growth at a depth of 1.5 to 3 feet

Included with this complex in mapping are small areas of Memphis, Providence, and Lexington soils on narrow upland ridgetops and steep hillsides. The included soils make up about 16 percent of the complex.

The soil in this complex is mainly used as woodland or pasture (fig. 12). It was formerly cultivated, but because of severe sheet and gully erosion, crops are no longer grown.

The Loring soil and gullies are not suited to row crops, truck crops, small grains, and pasture. Because of the steep slopes, rapid runoff, and the severe hazard of erosion, the soil in this complex is better suited to use as woodland than to other uses.

The soil of this complex is suited to loblolly pine. Steepness of slope is a moderate to severe limitation for forest management operations, such as logging and site preparation. Water bars, revegetation of disturbed areas, and layout of logging roads and skid trails to avoid steep grades are essential because the soil is highly erodible. In site preparation, a cover of mulch should be left to prevent erosion. Drum chopping and approved herbicides are preferred to shearing and windrowing.

The soil in this complex has severe limitations for urban uses because of the steepness of slope and the deep, wide gullies. The Loring soil also has severe limitations because of wetness and low strength as it affects local roads and streets. It has severe limitations for use as septic tank absorption fields because of wetness and the restricted permeability in the fragipan. These limitations can be partly overcome by installing field lines on the contour.

Gullied land is not assigned to a capability subclass. The Loring soil is in capability subclass VIIe. Gullied land does not support commercial production of trees and is not assigned a woodland ordination symbol. The woodland ordination symbol is 9A for the Loring soil.

48—Gullied land-Smithdale complex. This complex consists of small areas of gullies and Smithdale soil that are too intermingled to be mapped separately at the selected scale. The Smithdale soil is sloping to steep and well drained. It formed in loamy material on upland hillsides. This soil is on narrow ridges between deep, wide, irregularly shaped gullies. The gullied land formed in loamy material. The areas of this map unit are irregular in shape and range from 15 to 600 acres. Slopes range from 5 to 25 percent.

The gullies make up about 50 percent of the map unit. Typically, they consist of soils that have been so severely eroded by water that soil horizons have been destroyed beyond recognition. The texture is variable. It is dominantly sandy, but it ranges from loam to sandy clay loam.

The gullies occur on all slope positions. Many of the wider gullies have flat bottoms in which there has been thinly stratified accumulations of sand and silt. These accumulations are up to about 40 inches deep. The soils in many of the gully floors have stabilized and have a moderate site index for pine trees. The gully walls, which range from 2 to 30 feet in height, are almost vertical and many remain bare. V-shaped gullies have less accumulation on the floor and generally have more gently sloping walls. The gully walls and other areas of little or no accumulation have a low site index for trees. The soil in the gullies is very strongly acid or strongly acid. The available water capacity and permeability are variable. Surface runoff is rapid.

Figure 12.—Because of severe erosion, most areas of the Gullied land-Loring complex have been planted to loblolly pine.

The Smithdale soil makes up about 26 percent of the map unit. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 3 inches; dark brown sandy loam

Subsoil:
3 to 20 inches; yellowish red sandy clay loam
20 to 80 inches; yellowish red sandy loam that has pockets of uncoated loamy sand

Important properties of the Smithdale soil:

Permeability: moderate

Available water capacity: moderate

Soil reaction: very strongly acid or strongly acid except where lime has been added

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, easily penetrated by roots to a depth of 60 inches or more

Included with this complex in mapping are the Providence and Loring soils on narrow upland ridgetops and small areas of Bruno soils on narrow flood plains. The included soils make up about 24 per cent of the complex.

The soil of this complex is mainly used as woodland. In a few areas, it is used as pasture. Many areas of this complex were formerly cultivated, but because of severe sheet and gully erosion, crops are no longer grown.

The Smithdale soil and Gullied land are not suited to row crops, truck crops, small grains, and pasture. Because of the steep slopes, rapid runoff, and severe hazard of erosion, the soil in this complex is better suited to woodland than to other uses.

The soil of this complex is suited to loblolly pine and shortleaf pine. Steepness of slope is a moderate to severe limitation for forest management operations, such as logging and site preparation. Water bars, revegetation of disturbed areas, and layout of logging roads and skid trails to avoid steep grades are essential because the soil is highly erodible. In site preparation, a cover of mulch should be left to prevent erosion. Drum chopping and approved herbicides are preferred to shearing and windrowing.

The soil in this complex has severe limitations for urban uses because of the steepness of slope and the deep, wide gullies. The problems caused by steepness of slope can be partly overcome by special design and careful installation. The steep, rough slopes are also a severe limitation for septic tank absorption fields. This limitation can be partly overcome by installing field lines on the contour.

Gullied land is not assigned to a capability subclass. The Smithdale soil is in capability subclass VIIe. Gullied land does not support commercial production of trees and is not assigned a woodland ordination symbol. The woodland ordination symbol is 8R for the Smithdale soil.

50—Udorthents, gravelly. These areas consist of open excavations from which gravel and sand have been removed. These gravel and borrow pits are throughout the county. Some pits are fairly high in clay content. The material excavated from these pits is locally called clay gravel. The gravel is several feet thick. Depth to this material ranges from 5 to 50 feet or more.

Included with the Udorthents, gravelly, are areas where clay has been excavated, and a few areas from which silty material was excavated for use as fill material.

Some abandoned areas of this map unit are reverting to woodland. A few areas have a good stand of pine trees. In the open areas, the soil material supports low quality grass and trees that are useful only for erosion control (fig. 13). The soil material is mainly loamy and has only moderate amounts of gravel. Many acres of the map unit are bare of vegetation. Udorthents generally are poorly suited to crops, grasses and legumes, and trees. They have moderate to severe limitations for most urban uses.

Udorthents, gravelly, are not assigned to a capability subclass. They do not have a woodland ordination symbol.

60F1—Natchez-Saffell association, hilly. This association consists of soils that are hilly and well drained. These soils are on uplands in a narrow band along the bluffs adjacent to the delta. Natchez soil formed in silty material, and Saffell soil formed in loamy material that has a high content of gravel. These soils are in a regular and repeating pattern along the bluff face and on steep, choppy slopes dissected by numerous short drainageways. Individual areas of each soil are large enough to map separately, but because of similar present and expected uses, they were mapped as one unit. Areas of these soils are 160 to 400 acres. Slopes range from 12 to more than 45 percent.

The Natchez soil makes up about 55 percent of the map unit. Slopes range from 12 to 45 percent. The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 2 inches; dark brown silt loam

Subsurface layer:
2 to 6 inches; yellowish brown silt

Subsoil:
6 to 22 inches; dark yellowish brown silt loam

Substratum:
22 to 78 inches; dark yellowish brown silt

Important properties of the Natchez soil:

Permeability: moderate

Available water capacity: high

Soil reaction: strongly acid to neutral in the surface and subsurface layers and the subsoil; neutral to moderately alkaline in the substratum

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, easily penetrated by roots to a depth of 60 inches or more

The Saffell soil generally is on the middle and lower parts of hillsides. It makes up about 41 percent of the map unit. Slopes range from 17 to 45 percent or more.

Figure 13.—Gravel and sand have been excavated from this area of Udorthents, gravelly. The soil supports only low quality plants.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 4 inches; dark brown fine sandy loam

Subsurface layer:
4 to 9 inches; yellowish brown gravelly sandy loam

Subsoil:
9 to 17 inches; strong brown very gravelly fine sandy loam
17 to 37 inches; dark brown very gravelly sandy loam

Substratum:
37 to 60 inches; yellowish brown very gravelly loamy sand

Important properties of the Saffell soil:

Permeability: moderate

Available water capacity: low

Soil reaction: very strongly acid or strongly acid except where lime has been added

Surface runoff: rapid

Erosion hazard: severe

Seasonal high water table: none within a depth of 6 feet

Flooding: none

Root zone: deep, to a depth of 60 inches or more

Included with these soils in mapping are a few small areas of Memphis soils on ridgetops and small areas of clayey and sandy soils on steep hillsides. Old gullies that are well stabilized with trees are common in some delineations. The included soils make up 4 percent of the unit.

The Natchez and Saffell soils are mainly used as woodland. A small acreage is used for grasses and legumes for hay and pasture.

These soils are poorly suited to row crops, hay, and pasture because of the steepness of slope, rapid runoff, and the severe hazard of erosion.

Natchez soil is well suited to cherrybark oak, sweetgum, loblolly pine, eastern cottonwood, green ash, water oak, and yellow poplar. Saffell soil is poorly suited to loblolly pine, shortleaf pine, white oak, and chestnut oak. Productivity is low. If trees are planted on Saffell soil, pines are recommended. Steepness of slope is a moderate to severe limitation for forest management operations, such as logging and site preparation. Water bars, revegetation of disturbed areas, and layout of logging roads and skid trails to avoid steep grades are essential because these soils are highly erodible. In site preparation, a cover of mulch should be left to prevent erosion. Drum chopping and approved herbicides are preferred to shearing and windrowing.

These soils have severe limitations for urban uses because of steepness of slope. These limitations can be partly overcome by special design and careful installation. Steepness of slope is also a severe limitation for use as septic tank absorption fields. This can be partly overcome by installing field lines on the contour.

This Natchez soil is in capability subclass VIe, and the Saffell soil is in capability subclass VIIe. The woodland ordination symbol is 9R for the Natchez soil and 7R for the Saffell soil.

72—Crevasse sand, occasionally flooded. This soil is nearly level and is excessively drained. It is on flood plains mainly in the western part of the county along the larger meandering streams and near levee breaks on the delta. This soil formed in sandy alluvium. Slopes are 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 4 inches; yellowish brown sand

Underlying material:
4 to 60 inches; pale brown, light yellowish brown, and very pale brown sand

Important soil properties:

Permeability: rapid

Available water capacity: low

Soil reaction: medium acid to moderately alkaline

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: 3.5 to 6 feet in winter and spring

Flooding: occasional, for brief periods in winter and early in spring before crops are planted

Root zone: deep, to a depth of 60 inches or more

Tilth: soil is easy to maintain, can be tilled throughout a wide range of moisture content

Included with this soil in mapping are a few small areas of Bruno soils on flood plains. Bruno soils are further from the stream than the Crevasse soil. A few small areas of soils that contain high amounts of gravel are included. The included soils make up about 10 percent of this map unit.

Most areas of this Crevasse soil are idle (fig. 14). A small acreage is used as woodland or pasture.

This soil is poorly suited to cultivated crops because of droughtiness and flooding. Some areas of this soil are subject to frequent flooding. Using conservation tillage and incorporating plant residue into the soil are recommended if this soil is used for crops. Soil blowing is a severe hazard in spring if the soil is bare.

This soil is poorly suited to use as pasture. Adapted pasture plants include bahiagrass, bermudagrass, and weeping lovegrass. Droughtiness and flooding reduce productivity. Proper stocking, controlled grazing, and weed and brush control help keep the pasture and soil in better condition.

This soil is moderately suited to eastern cottonwood, hackberry, pecan, sweetgum, white oak, and American sycamore. The sand in this soil can cause droughty conditions, which increase seedling mortality. To overcome this problem, increase the planting rate, control competing vegetation with approved herbicides, and maintain a mulch cover to preserve soil moisture.

This soil is poorly suited to most urban uses because of flooding. Flooding, wetness, and the coarse textured soil material, which does not filter effluent sufficiently, severely limit the use of this soil as septic tank absorption fields.

This Crevasse soil is in capability subclass IVs. The woodland ordination symbol is 7S.

80—Bonn silt loam, occasionally flooded. This soil is level and poorly drained. It is high in exchangeable sodium. This soil formed in silty material on broad, low terraces and flood plains. Slopes are 0 to 1 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 7 inches; grayish brown silt loam that has mottles in shades of yellow

Subsurface layer:
7 to 20 inches; light brownish gray silt loam that has mottles in shades of brown

Figure 14.—Most areas of Crevasse sand, occasionally flooded, are idle because the soil is subject to flooding and to droughtiness.

Subsoil:

20 to 34 inches; mottled brown and light brownish gray silt loam that has mottles in shades of red

34 to 52 inches; light brownish gray silt loam that has mottles in shades of brown

Substratum:

52 to 65 inches; yellowish brown silt loam that has mottles in shades of brown and gray

Important soil properties:

Permeability: very slow

Available water capacity: low

Soil reaction: very strongly acid to neutral in the surface and subsurface layers, medium acid to strongly alkaline in the subsoil, and neutral to strongly alkaline in the substratum

Surface runoff: slow, ponding is common

Erosion hazard: slight

Seasonal high water table: perched 2 feet or less below the surface in wet periods; the soil is waterlogged for long periods

Flooding: occasional, for brief periods from fall to late in spring

Root zone: shallow, high amount of sodium restricts root growth at about 1.5 feet

Tilth: soil tends to crust after rains

Included with this soil in mapping are a few small areas of Calloway soils on uplands and terraces. These soils are in slightly higher positions than the Bonn soil. A few small areas of silty soils that are moderately well drained are also included.

The acreage of this Bonn soil is about evenly divided among cropland, pasture, and woodland.

This soil is poorly suited to row crops, small grains, and truck crops because of low productivity. Wetness, the high exchangeable sodium content of the subsoil, the hazard of flooding, and ponding are limitations. Conservation tillage, proper row arrangement, surface field ditches, and incorporation of crop residue into the subsoil are recommended if crops are grown.

This soil is poorly suited to pasture and hay; however, grasses and legumes will grow. Wetness limits the choice of plants and the period of cutting or grazing. Proper stocking, controlled grazing, and weed and brush control help keep the soil and pasture in good condition.

This soil is poorly suited to most trees for commercial production. Low productivity, equipment use limitations caused by seasonal wetness, and seedling mortality are severe problems in management of woodland.

This soil has severe limitations for urban uses and septic tank absorption fields mainly because of wetness, the hazard of flooding, and low strength as it affects local roads and streets.

This Bonn soil is in capability subclass IVs. It does not have a woodland ordination symbol.

210—Adler silt loam. This soil is nearly level and moderately well drained. It formed in silty alluvium. This soil is mainly on the delta on alluvial fans and aprons that are protected from flooding by levees (fig. 15). Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:

Figure 15.—This Adler silt loam is protected from flooding by levees and is well suited to agricultural uses.

0 to 7 inches; dark brown silt loam that has grayish brown mottles

Underlying material:

7 to 37 inches; yellowish brown silt loam that has mottles in shades of brown and gray; mottled in shades of brown and gray below a depth of 26 inches

37 to 60 inches; gray silt loam that has mottles in shades of gray and brown

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: medium acid to mildly alkaline

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: fluctuates between 2 and 3 feet below the surface in wet periods in winter and early in spring

Flooding: rare

Root zone: deep, to a depth of 60 inches or more

Tilth: soil is easy to keep in good tilth, but tends to crust

Included with this soil in mapping are a few small areas of Ariel and Morganfield soils. These soils are in slightly higher positions on the flood plain than the Adler soil. A few small areas of a soil that has high content of exchangeable sodium are included. A few small sandy spots are at a higher elevation in some fields. Soils that are subject to occasional flooding are in a few small lower-lying areas.

This Adler soil is mainly used for crops. A small acreage is used as pasture or woodland.

This soil is well suited to row crops, small grains, and truck crops; however, seasonal wetness is a limitation. Plant rows should be arranged and surface field ditches constructed to remove excess surface water. Returning crop residue to the soil improves fertility, helps to maintain tilth, and reduces crusting and packing. Seedbed preparation and cultivation are sometimes delayed in the spring because of wetness.

This soil is well suited to grasses and legumes for pasture or hay. Overgrazing or grazing when the soil is too wet, however, causes compaction and slow infiltration and results in poor tilth. Proper stocking, controlled grazing, pasture rotation, weed and brush control, and restricted use during wet periods help keep the pasture and the soil in good condition.

This soil is well suited to eastern cottonwood, willow oak, water oak, green ash, sweetgum, yellow poplar, and American sycamore. It has no major limitations for normal forestry operations.

This soil has severe limitations for urban uses mainly because of seasonal wetness and rare flooding. Wetness is a severe limitation to the use of this soil as septic tank absorption fields.

This Adler soil is in capability class I. The woodland ordination symbol is 13A.

250—Morganfield silt loam. This soil is nearly level and well drained. It formed in silty alluvium on flood plains. This soil is on the delta on alluvial fans and aprons that have been protected from flooding. Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:

0 to 6 inches; brown silt loam

Underlying material:

6 to 17 inches; brown silt loam that has pale brown mottles

17 to 28 inches; yellowish brown silt loam that has brown mottles

28 to 60 inches; dark yellowish brown silt loam that has grayish brown mottles

Important soil properties:

Permeability: moderate

Available water capacity: high

Soil reaction: medium acid to mildly alkaline

Surface runoff: slow

Erosion hazard: slight

Seasonal high water table: 3 to 4 feet below the surface in winter and early in spring

Flooding: rare

Root zone: deep, easily penetrated by plant roots to a depth of 60 inches or more

Tilth: good, soil tends to crust after hard rains

Included in mapping are small areas of Adler, Ariel, Oaklimeter, and Bruno soils. Adler soils are in slightly lower positions on flood plains than the Morganfield soil. Ariel and Oaklimeter soils are in positions similar to those of the Morganfield soil. Bruno soils are on flood plains near streams and levee breaks.

Figure 16.—Sharkey clay, ponded, remains wet for several months each year.

This Morganfield soil is mainly used for crops. A small acreage is used as woodland or pasture.

This soil is well suited to row crops, small grains, and truck crops. Plant rows should be arranged and surface field ditches constructed to remove the excess surface water. Returning crop residue to the soil improves soil fertility, helps to maintain tilth, and reduces crusting.

This soil is well suited to grasses and legumes for pasture or hay; however, overgrazing or grazing when the soil is too wet causes compaction, slows infiltration, and results in poor tilth. Proper stocking, controlled grazing, pasture rotation, and weed and brush control help to maintain the pasture and soil.

This soil is well suited to eastern cottonwood, green ash, yellow poplar, sweetgum, Nuttall oak, water oak, and American sycamore. It has no major limitations for normal forestry operations.

This soil is poorly suited to use as sites for dwellings and to other urban uses because of rare flooding. Flooding also limits the use for local roads and streets. Wetness is a severe limitation to the use of this soil as septic tank absorption fields.

This Morganfield soil is in capability class I. The woodland ordination symbol is 13A.

300—Sharkey clay, ponded. This soil is nearly level and is poorly drained. It is in depressional backswamps and on flood plains of the delta where runoff of water has been very slow. This soil formed in clayey slack water sediment. Areas of this soil also receive water from the sides of natural levees. This soil is wet most of the time, and large areas remain ponded for several months each year (fig. 16). Slopes range from 0 to 2 percent.

The typical sequence, depth, and composition of the layers of this soil are as follows:

Surface layer:
0 to 5 inches; dark grayish brown clay
5 to 15 inches; gray clay that has reddish mottles

Subsoil:
15 to 36 inches; gray clay that has brownish mottles

Substratum:
36 to 60 inches; light brownish gray silty clay that has brownish mottles

Important soil properties:

Permeability: very slow

Soil reaction: strongly acid to moderately alkaline in the surface layer except where lime has been added, medium acid to moderately alkaline in the subsoil, and neutral to moderately alkaline in the substratum

Surface runoff: very slow

Erosion hazard: slight

Seasonal high water table: near the surface most of the year

Flooding: none, but ponded for brief to very long periods in winter to early in summer

Root zone: deep, to a depth of 60 inches or more

Included with this soil in mapping are some small areas of Bonn and Adler soils. These soils are at a slightly higher elevation than the Sharkey soil and have received silty sediment from nearby uplands. Other poorly drained and somewhat poorly drained alluvial soils are scattered throughout the areas of this Sharkey soil. A few small areas of sandy soils are in some delineations.

Most of the acreage of this Sharkey soil is bottom land hardwoods. Small acreages are used for row crops or pasture.

This Sharkey soil is not suited to row crops or pasture because of wetness and ponding.

This soil is moderately suited to water hickory, overcup oak, baldcypress, and black willow. Ponding is a limitation. Wetness is a moderate to severe limitation for forest management operations, such as logging and reforestation. Logging operations should be restricted to seasonal dry periods late in summer and in fall. Logging on wet soils causes compaction and can reduce site productivity. Seedling mortality is high on these sites because of the increased competition from undesirable vegetation. This limitation can be overcome by using mechanical cultivation and approved herbicides and by increasing the planting rate.

This soil has severe limitations for urban uses because of ponding, wetness, and shrink-swell properties. In addition, low strength is a severe limitation for local roads and streets. These limitations are difficult to overcome. This soil is poorly suited to use as septic tank absorption fields because of ponding and wetness. Most areas are difficult to drain because of inadequate outlets.

This Sharkey soil is in capability subclass Vw. The woodland ordination symbol is 6W.

Prime Farmland

In this section, prime farmland is defined and discussed, and the prime farmland soils in Carroll County are listed.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. The moisture supply, of course, must be adequate, and the growing season has to be sufficiently long. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They either are used for producing food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water control structures. Public land is land not available for farming in national forests, national parks, military reservations, and state parks.

Prime farmland soils usually get an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not subject to frequent flooding during the growing season. The slope ranges mainly from 0 to 5 percent.

The following map units, or soils, make up prime farmland in Carroll County. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 5. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Soils that have limitations, such as a high water table or flooding, may qualify as prime farmland if these limitations are overcome by such measures as drainage or flood control. In the following list, the measures needed to overcome the limitations of a map unit, if any, are shown in parentheses after the map unit name. Onsite evaluation is necessary to determine if the limitations have been overcome by the corrective measures.

1A Calloway silt loam, 0 to 1 percent slopes
2A Dubbs silt loam, 0 to 2 percent slopes
3A Dundee silt loam, 0 to 2 percent slopes
4A Grenada silt loam, 0 to 1 percent slopes
4B Grenada silt loam, 1 to 3 percent slopes
5B2 Loring silt loam, 2 to 5 percent slopes, eroded
6A Memphis silt loam, 0 to 2 percent slopes
6B2 Memphis silt loam, 2 to 5 percent slopes, eroded
20 Alligator silty clay
21 Adler silt loam, occasionally flooded
24 Forestdale silt loam
25 Morganfield silt loam, occasionally flooded
26 Oaklimeter silt loam, occasionally flooded
28 Ariel silt, occasionally flooded
43 Falaya silt, occasionally flooded
210 Adler silt loam
250 Morganfield silt loam

Alligator silty clay and Forestdale silt loam are considered prime farmland where the high water table is maintained at a sufficient depth during the cropping season to allow cultivated crops common to the area to be grown. The soils that are occasionally flooded are flooded for brief periods in winter and early in spring before crops are planted.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in Carroll County. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties (fig. 17).

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Reginald M. Spears, conservation agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

According to the 1982 Census of Agriculture, about 173,300 acres in Carroll County was used for crops and pasture *(24)*. About 216,500 acres is woodland *(21)*.

Soil erosion is a major problem on about 40 percent of the cropland and pasture in the county. Erosion is a hazard on soils that have slopes of more than 2 percent.

Productivity is reduced as the surface layer is lost and part of the subsoil is mixed with the plow layer. Loss of the surface layer is especially damaging to the soils that have a fragipan, which limits rooting depth. Calloway, Dulac, Grenada, Loring, and Providence soils have a fragipan. Control of erosion reduces the amount of sediment going into streams, which improves the quality of water for municipal and recreation uses and for use by fish and wildlife.

The kind of soil, the slope, and the degree of erosion determine the length of time a soil should be cultivated as related to the time it should be protected by a plant cover or sod crop in a rotation. If cultivated crops are grown, surface runoff can be controlled to reduce erosion. Terraces, conservation tillage, contour farming, and wide strips of close-growing vegetation can control runoff and erosion. Water from the terraces should be discharged into grassed waterways or pipe outlets. Returning crop residue to the soil increases infiltration and reduces runoff and the hazard of erosion.

For contour cultivation, tillage operations are applied using terraces as guidelines. A contour furrow slows the velocity of flowing water, which allows more infiltration into the soil. Contour cultivation is needed on gently sloping soils to control runoff and reduce erosion.

The Adler, Alligator, Ariel, Falaya, Morganfield, Oaklimeter, and Sharkey soils on flood plains need main and lateral ditches and surface field ditches to remove excess surface water. Diversions can also protect these soils from runoff of adjoining hills. Bonn soils are poorly drained and also need surface drainage.

The soils in Carroll County are suited to many kinds of pasture plants including common bermudagrass,

Figure 17.—Soil slippage is a potential problem in some areas of Carroll County. The soil is Loring silt loam, 8 to 12 percent slopes, severely eroded.

improved bermudagrass, bahiagrass, Dallisgrass, and ryegrass. The grazing capacity of the pasture depends largely upon the amount of fertilizer applied and favorable weather conditions. The amounts and kinds of fertilizer should be determined by soil tests.

The grazing should be regulated to maintain good growth of forage and to protect the soils. After a period of grazing, a rest period is needed so that pasture plants can develop new growth. Weeds should be controlled by mowing or spraying.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, animal manure, and green manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely

to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit *(18)*. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production. No soils in class VIII were recognized in Carroll County.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry. No soils in capability subclass *c* were recognized in Carroll County.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w, s,* or *c*.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Woodland Management and Productivity

William A. Hannaford, forester, Soil Conservation Service, helped prepare this section.

Soils vary in their ability to produce trees. Depth, fertility, texture, and the available water capacity influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Available water capacity and depth of the root zone are major influences of tree growth. Elevation and aspect are of particular importance in mountainous areas.

About 204,800 acres, or 50 percent, of Carroll County is commercial forest *(21)*. Commercial forest land produces or is capable of producing industrial wood crops and is not withdrawn from such use *(19, 22)*. The commercial forest is owned as follows: 107,300 acres by miscellaneous private owners, 6,400 acres by forest industry, and 85,500 acres by farmers. The rest is in public ownership *(21)*.

The commercial forest is subdivided into forest types, which generally require separate management and treatment. The types are based on species composition, site quality, or age *(13, 17)*. As used in this survey, forest types are stands of similar character, composed of the same species and growing under the same ecological and biological conditions. The forest types are named for the predominant tree species.

The *oak-hickory* forest type is the largest in the county. It makes up about 51 percent of the commercial forest land. The *oak-pine* forest type makes up about 24 percent; *oak-gum-cypress,* about 13 percent; and *loblolly-shortleaf pine,* about 12 percent *(17, 21)*.

Climate and soils are the most important environmental factors influencing tree growth and occurrence. In addition to being a reservoir of moisture for a tree, soil provides most of the essential elements required for growth *(13, 14)*. Soil also provides the medium in which a tree is anchored. The chemical composition, texture, structure, depth, and position of the soil affect the growth of a tree to the extent to which they affect the supply of moisture and nutrients.

The position on slope strongly influences species composition. Moisture-loving species, such as sweetgum and yellow poplar, thrive on moderately moist, well drained, loamy soils that are on lower to middle slopes and along streams. Oak, hickory, and pine grow well on middle slopes and ridges.

Good forest management helps to maintain or improve soil productivity and water quality. Forest management activities, such as timber harvesting and site preparation, have the greatest potential for adversely affecting soil productivity and water quality. Careless application of those practices can cause erosion, nutrient depletion, and soil compaction. Site specific forest management recommendations that consider topography, season, natural site fertility, and the hazard of erosion can prevent damage to soil and water resources *(14)*.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to fertilization than others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special efforts to reforest. In the section "Detailed Soil Map Units," each map unit in the survey area suitable for producing timber presents information about productivity, limitations for harvesting timber, and management concerns for producing timber. Table 8 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

The first tree listed for each soil under the column "Common trees" is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

Table 8 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *R* indicates a soil that has a significant limitation because of steepness of slope. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *C* indicates a soil that has a limitation because of the kind or amount of clay in the upper part of the soil. The letter *S* indicates a dry, sandy soil. The letter *A* indicates a soil that has no significant restrictions or limitations for forest use and management. If a soil has more than one limitation, the priority is as follows: R, W, C, and S.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation activities or harvesting operations expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of *moderate* or *severe* indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning of harvesting and reforestation operations, or use of specialized equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment must be used. On the steepest slopes, even tracked equipment cannot operate; more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are steep enough that wheeled equipment cannot be operated safely across the slope, if soil wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts ground-based equipment, or if special equipment is needed to avoid or reduce soil compaction. The rating is *severe* if slopes are steep enough that tracked equipment cannot be operated safely across the slope, if soil wetness restricts equipment use for more than 6 months per year, if stoniness restricts ground-based equipment, or if special equipment is needed to avoid or reduce soil compaction. Ratings of *moderate* or *severe* indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management operations.

Ratings of *seedling mortality* refer to the probability of death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall as influenced by kinds of soil or topographic features. *Seedling mortality* is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth and duration of the water table, rock fragments in the surface layer, rooting depth, and the aspect of the slope. Mortality generally is greatest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site

preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of *moderate* or *severe* indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing surface drainage, or providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is *moderate* or *severe*.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. *Plant competition* becomes more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants reduces adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants reduces natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A *moderate* or *severe* rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers must plan site preparation measures to ensure reforestation without delays.

The potential productivity of *common trees* on a soil is expressed as a *site index*. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The procedure and technique for determining site index are given in the site index tables used for the Carroll County soil survey *(3, 4, 5, 6, 7, 8, and 11)*.

The *productivity class* represents an expected volume produced by the most important trees, expressed in cubic meters per hectare per year. Cubic meters per hectare can be converted to cubic feet per acre by multiplying by 14.3. It can be converted to board feet by multiplying by a factor of about 71. For example, a productivity class of 8 means the soil can be expected to produce 114 cubic feet per acre per year at the point where mean annual increment culminates, or about 568 board feet per acre per year.

Trees to plant are those that are used for reforestation or, if suitable conditions exist, natural regeneration. They are suited to the soils and will produce a commercial wood crop. Desired product, topographic position (such as a low, wet area), and personal preference are three factors of many that can influence the choice of trees to use for reforestation.

Woodland Understory Vegetation

David W. Sanders, grassland conservationist, Soil Conservation Service, helped prepare this section.

Understory vegetation consists of grasses, forbs, shrubs, and other plants. Some woodland, if well managed, can produce enough understory vegetation to support grazing of livestock or wildlife, or both, without damage to the trees.

The quantity and quality of understory vegetation vary with the kind of soil, the age and kind of trees in the canopy, the density of the canopy, and the depth and condition of the litter. The density of the canopy determines the amount of light that understory plants receive.

Significant changes in kinds and abundance of plants occur as the canopy changes, often regardless of grazing use. Therefore, the forage value rating of grazable woodland in this survey is not an ecological evaluation of the understory. Forage value ratings are based on the percentage of the existing understory plant community made up of preferred and desirable plant species as they relate to livestock palatability.

Table 9 shows, for each soil suitable for woodland use, the potential for producing understory vegetation. The total production of understory vegetation includes only the herbaceous plants. It is expressed in pounds per acre of air-dry vegetation in a normal year. In a normal year, soil moisture is average during the optimum part of the growing season.

Table 9 also lists the common names of the characteristic vegetation on each soil and the percentage composition, by air-dry weight, of each kind of plant. The table shows the kind and percentage of understory plants expected under a canopy density that is most nearly typical of woodland in which the production of wood crops is highest.

Environmental Plantings

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly ornamental shrubs and trees, are closely spaced. To insure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 10 shows the suitability of the soils for environmental plants grown in Carroll County. The height that locally grown trees and shrubs are expected to reach in 20 years on various soils is also given. The estimates in table 10 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning screens. Additional information on planning

screens and on planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service, or from a nursery.

Recreation

E.E. Dorrill, III, landscape architect, Soil Conservation Service, helped prepare this section.

In table 11, the soils of Carroll County are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 11, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 11 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 14 and interpretations for dwellings without basements and for local roads and streets in table 13.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Michael J. Hinton, wildlife biologist, Soil Conservation Service, helped prepare this section.

Carroll County has about 204,800 acres of woodland *(21)*, 95,164 acres of pasture, and 85,199 acres of cropland *(24)*. The extreme western edge of the county is on the delta and is intensively cropped. The central and eastern parts of the county are mainly hilly uplands. The Big Black River flows through the southeastern section of the county. Diverse geographic features and land use provide habitat for many wildlife species. Demand for quality hunting areas is high, and many woodland tracts are leased by organized hunting clubs. Many farm ponds, floodwater retarding structures, and streams provide good to excellent fishing opportunity.

Woodland managed for pine production exceeds 105,000 acres *(15)*. Unmanaged pine forests provide poor habitat for deer, squirrels, rabbits, bobwhite quail, and wild turkey. Managed pine forests, however, provide good habitat for many game and nongame species. Prescribed burning, thinning, clearcutting small areas, and leaving hardwood corridors along streams benefit wildlife. Some landowners establish wildlife food plots in forest openings.

Hardwoods along major streams and in wetland areas provide good to excellent wildlife habitat. Water oak, overcup oak, swamp chestnut oak, red maple, ash, pecan, hickory, and tupelo gum are in these areas.

Wetlands are mainly on the delta and on the flood plains of major streams. They are associated with beaver activity. Wetland areas provide excellent habitat for

migrating waterfowl, wood ducks, wading birds, furbearers, reptiles, and amphibians.

The pastureland in the county is intensively grazed or cut for hay. It provides only limited habitat for quail, rabbits, and other species that utilize this habitat type.

Crop residue and wasted grain provide an important food source for game and nongame species in Carroll County. Erosion control practices beneficial to wildlife include conservation tillage, field borders, and terraces.

Farm ponds, floodwater retarding structures, lakes, rivers, and streams provide fishing for largemouth bass, bluegill, redear, channel catfish, crappie, flathead catfish, and other species. Streams in this county have widely fluctuating flows and are moderately turbid during much of the year. Most farm ponds and floodwater retarding structures are stocked with largemouth bass, redear, bluegill, and channel catfish. Various degrees of management are applied, but many of the lakes and ponds have unbalanced fish populations.

Part of the state-owned Malmaison Game Management Area is in Carroll County. This area is managed for game and nongame wildlife.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 12, the soils in Carroll County are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and millet.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, lespedeza, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, johnsongrass, and partridge pea.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are autumn olive, crabapple, and sawtooth oak.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and cedar.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are strawberry bush, American beautyberry, and oakleaf hydrangea.

Wetland plants are annual and perennial, wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, mourning dove, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Engineering

Bobby F. Pierce, agricultural engineer, Soil Conservation Service, helped prepare this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet, and because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works. Some soils in Carroll County have dispersive properties caused by a combination of low plasticity and a high percentage of sodium salts in the total soluble salt content. Sinkholes sometimes form on structures built from these soils. Onsite investigations are required to isolate these areas so they can be treated or avoided (fig. 18).

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations must be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to: evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 13 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that

Figure 18.—Dispersive soils create problems in some areas of Carroll County. Onsite investigation is necessary to identify these areas before construction.

special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to a cemented pan or a very firm dense layer, the stone content, the soil texture, and the slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to a cemented pan, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a

flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to a cemented pan, depth to a high water table, flooding, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts and sodium affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 14 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 14 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table or to a cemented pan, and flooding affect absorption of the effluent. A cemented pan interferes with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 14 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table or to a cemented pan, flooding, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and cemented pans can cause construction problems.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 14 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a cemented pan or to a water table, slope, and flooding affect both types of landfill. Texture, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated

slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over a cemented pan or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 15 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 15, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. All other soils are rated as an improbable source.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or soluble salts, or soils

that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant-available nutrients as it decomposes.

Water Management

Table 16 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and the salinity of the soil.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to a cemented pan, the slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by slope and depth to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, and depth to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness, slope, and depth to a cemented pan affect the construction of grassed waterways. A hazard of erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 17 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, MH, and CH. Soils exhibiting engineering properties of two groups can have a dual classification, for example, ML-CL.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area, or from nearby areas, and on field examination.

Physical and Chemical Properties

Table 18 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by

weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They influence the soil's adsorption of cations, moisture retention, shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 18, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 19 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the intake of

water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 19 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (there is a near 0 to 5 percent chance of flooding in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (there is a 5 to 50 percent chance of flooding in any year). *Frequent* means that flooding occurs often under normal weather conditions (there is more than a 50 percent chance of flooding in any year). *Common* is used when classification as occasional or frequent does not affect interpretations. Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. November-May, for example, means that flooding can occur during the period November through May. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 19 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 19.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

The two numbers in the "High water table-Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that the water table exists for less than a month.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Physical and Chemical Analyses of Selected Soils

D.E. Pettry, professor, soil science, Mississippi State University, prepared this section.

The results of physical analysis of several typical pedons in the survey area are given in table 20 and the results of chemical analysis in table 21. The data are for soils sampled at carefully selected sites. The pedons are typical of the series unless noted otherwise and are described in the section "Soil Series and Their Morphology."

The soil analyses reported in tables 20 and 21 were made in the Soil Genesis and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station. Standard methods were used to analyze the soils *(23)*. Representative soil samples were collected from pedons at different locations in Carroll County. Samples were prepared for analysis by air-drying, carefully crushing, and screening through a standard 20-mesh sieve.

The particle-size analyses shown in table 20 were obtained using Day's hydrometer method *(9)*. Soil reaction (pH) in table 21 was determined with a Coleman pH meter using a glass electrode and a 1:1 ration of soil and water. Exchangeable bases were extracted with neutral-normal ammonium acetate. Calcium, magnesium, potassium, and sodium were determined with a Perkin-Elmer atomic absorption instrument using strontium chloride to suppress interference (6N1b, 6O1b, 6Q1b, 6P1b). Extractable acidity (hydrogen plus aluminum) was extracted with barium chloride-triethanolamine solution buffered to pH 8.2 and was determined by back titration with hydrochloric acid (6H1a). All results are expressed on the basis of oven-dry weight at 110 degrees Celsius.

Base saturation shown in table 21 was calculated by dividing the sum of bases (calcium, magnesium, potassium, and sodium) by the sum of the cations and multiplying by 100. The sum of the cations includes the exchangeable bases and the extractable acidity (hydrogen plus aluminum). The sum of cations represents the cation-exchange capacity of the soil, which is a measure of the ability to retain and exchange cations.

Soil chemical data are expressed as milliequivalents (meq) per 100 grams of dry soil. To use this data, convert milliequivalents per 100 grams of the various cations to pounds per acre for the plow layer. The plow layer, or topsoil, of average soils to a depth of 6.67 inches weighs about 2 million pounds per acre. To convert the cations listed in table 21 to pounds per acre, multiply the milliequivalent per 100 grams by 400 for calcium, 240 for magnesium, 780 for potassium, and 460 for sodium.

Many of the soils in Carroll County are acid and have a relatively low capacity to retain plant nutrients (cations) because of the influence of siliceous parent material. Deep, well drained, loamy soils, such as Smithdale soils, that are in higher positions are very strongly acid or strongly acid and have a relatively low capacity to retain plant nutrients. However, crops grown on these soils respond to fertilizer.

Base saturation is related to weathering and reflects the replacement of bases by hydrogen. The Bonn soils on level, silty stream terraces have high sodium levels and base saturation values in the subsoil.

The Soil Taxonomy classification system used in the National Cooperative Soil Survey uses chemical soil properties to differentiate some categories. The Alfisol and Ultisol orders, which are classes in the highest category in the system, are separated on the basis of the percentage of base saturation in the lower part of the soil as determined by sum of cations. Ultisols have base staturation of less than 35 percent, whereas Alfisols have base saturation of 35 percent or more.

The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods *(23)*.

Coarse materials—(2-250 mm fraction) volume estimate of the percentage of all material greater than 2 mm (3B2).

Sand—(0.05-2.0 mm fraction) weight percentages of materials less than 2 mm (3A1).

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all materials less than 2 mm (3A1).

Extractable cations—ammonium acetate pH 7.0, uncorrected; calcium (6N2), magnesium (6O2), sodium (6P2), potassium (6Q2).

Extractable acidity—barium chloride-triethanolamine I (6H1a).

Cation-exchange capacity—sum of cations (5A3a).

Base saturation—sum of cations, TEA, pH 8.2 (5C3).

Reaction (pH)—1:1 water dilution (8C1a).

Soluble ions—atomic absorption; calcium (6N1b), magnesium (6O1b), sodium (6P1b), potassium (6Q1b).

The physical properties of soils, such as water infiltration and conduction, shrink-swell potential, crusting, ease of tillage, and available water capacity, are closely related to soil texture (the percentage of sand, silt, and clay).

Soils that have high silt content in the surface layer, such as Adler and Memphis soils, pack if cultivated. In intensively cultivated areas, a surface crust forms that can hinder plant emergence on these soils.

The deep, loamy soils on ridgetops and side slopes of ridges, such as the Smithdale soils, have relatively high sand content. The coarse textured surface layer enhances rapid water infiltration and is droughty. The

Saffell soils have a higher gravel content than other soils in Carroll County, which affects available water capacity.

Some soils in Carroll County, such as the Alligator and Maben soils, contain layers within a depth of 4 feet that are high in clay content. The volume of these layers changes with loss or gain of moisture, which can cause damage to buildings, roads, and other structures.

The chemical properties of soils and other soil features, such as permeability, structure, texture, and consistence, influence the limitations and potentials of any soil. Chemical properties are not evident in visual observations of a soil; laboratory analyses are necessary. The amount and type of clay minerals present and the organic matter content largely control the chemical nature of soils. These substances have the capacity to attract and hold cations. Cations are elements that have a positive charge and that are bonded to clay minerals and organic matter that have a negative charge.

The exchangeable cations may be removed or exchanged through leaching or plant uptake. Through cation exchange, soil acidity can be corrected by liming. Neutralizing 1 milliequivalent per 100 grams of extractable acidity (hydrogen plus aluminum) requires application of 1,000 pounds of calcium carbonate (lime) per acre.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(20)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 22 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning flood plain, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Aeric* identifies the subgroup that has more soil aeration than is typical for the great group. An example is Aeric Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-silty, mixed, acid, thermic Aeric Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series. For example, the Falaya series is a member of the coarse-silty, mixed, acid, thermic family of Aeric Fluvaquents.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (16)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (20)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Adler Series

The Adler series consists of nearly level, moderately well drained soils that formed in silty alluvium. These soils are on flood plains and on alluvial fans and aprons that extend onto the delta from the hill area of the county. Slopes range from 0 to 2 percent. The soils of the Adler series are coarse-silty, mixed, nonacid, thermic Aquic Udifluvents.

Adler soils are on the same landscape with Ariel, Bonn, Bruno, Crevasse, and Morganfield soils. Ariel soils are at a slightly higher elevation on flood plains, have a cambic horizon, and are more acid than the Adler soils. Bonn soils are on low terraces and flood plains and are high in exchangeable sodium. Bruno soils are on alluvial fans and aprons and on flood plains. They have a sandy control section. Morganfield soils are at a slightly higher elevation than the Adler soils and do not have mottles of chroma 2 or less within 20 inches of the surface.

Typical pedon of Adler silt loam; in a cultivated field about 1 mile west of the Pine Bluff community and 2,200 feet east of the Leflore County line; SE1/4NW1/4 sec. 11, T. 17 N., R. 1 E.

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; few fine distinct grayish brown (10YR 5/2) mottles; weak fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

C1—7 to 26 inches; yellowish brown (10YR 5/4) and pale brown (10YR 6/3) silt loam; few medium distinct light brownish gray (10YR 6/2) mottles; massive; friable; thin prominent bedding planes; few fine roots; neutral; gradual smooth boundary.

C2—26 to 37 inches; mottled yellowish brown (10YR 5/4), pale brown (10YR 6/3), and light brownish gray (10YR 6/2) silt loam; massive; friable; thin prominent bedding planes; friable; few fine roots; neutral; clear smooth boundary.

C3g—37 to 60 inches; gray (10YR 5/1) silt loam; common medium distinct brown (7.5YR 4/4) and common medium faint light brownish gray (10YR 6/2) mottles; massive; friable; thin bedding planes; many reddish brown stains; slightly acid.

The reaction of these soils ranges from medium acid to mildly alkaline.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The C horizon has hue of 10YR, value of 4 to 6, and chroma of 3 to 6. Mottles that have chroma of 2 or less are within 20 inches of the surface, in some pedons, and few to many mottles that have chroma of 2 are below a depth of 20 inches. The lower part of the C horizon is mottled in shades of gray, yellow, and brown, or it has a gray matrix and few to many mottles.

The texture of the 10- to 40-inch control section is dominantly silt loam, but thin layers of very fine sandy loam or silt are in some pedons. Clay content ranges from 5 to 18 percent.

Alligator Series

The Alligator series consists of nearly level, poorly drained soils that formed in clayey slack water sediment of the Mississippi River. These soils are on flood plains of the delta. Slopes range from 0 to 2 percent. The soils of the Alligator series are very-fine, montmorillonitic, acid, thermic Vertic Haplaquepts.

The Alligator soils are adjacent to Dundee, Forestdale, and Sharkey soils on the landscape. Dundee and Forestdale soils are on slightly higher natural levees, are not as high in clay content, and do not have vertic properties. Sharkey soils are in depressional areas and on flood plains. They are nonacid.

Typical pedon of Alligator silty clay; in a cultivated field 5.5 miles northwest of Gravel Hill, 900 feet east of Leflore County line, and 2,900 feet south of gravel road; NW1/4SW1/4 sec. 7, T. 18 N., R. 2 E.

Ap—0 to 5 inches; dark gray (10YR 4/1) silty clay; weak fine granular structure; firm, plastic and sticky; common fine roots; very strongly acid; clear smooth boundary.

Bg1—5 to 19 inches; gray (10YR 6/1) clay; common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium angular and subangular blocky structure; few fine nonintersecting slickensides; firm, plastic and sticky; few fine roots; some material from Ap horizon in crack fillings; very strongly acid; gradual wavy boundary.

Bg2—19 to 41 inches; gray (5Y 5/1) clay; common medium prominent yellowish brown (10YR 5/6) mottles; moderate fine and medium angular blocky structure; common medium nonintersecting slickensides; firm, plastic and sticky; few fine roots; some material from Ap horizon in crack fillings; very strongly acid; gradual wavy boundary.

Bg3—41 to 50 inches; gray (5Y 5/1) silty clay; few fine prominent yellowish brown (10YR 5/6) mottles; weak fine angular blocky structure; common medium intersecting slickensides; firm, plastic and sticky; few fine roots; medium acid; gradual smooth boundary.

Cg—50 to 60 inches; gray (5Y 5/1) silty clay loam; few fine prominent yellowish brown (10YR 5/8) mottles; massive; firm, plastic and sticky; slightly acid.

The reaction of the upper 40 inches of these soils is very strongly acid or strongly acid except where lime has been added. The Cg horizon is slightly acid or neutral.

The A horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1 or 2.

The Bg horizon has hue of 10YR to 5Y, value of 4 to 6, and chroma of 1; or it has a hue of 10YR, 2.5Y, or 5Y, value of 6 or 7, and chroma of 2. Mottles in shades of brown and yellow range from few to many. The texture is silty clay or clay. The 10- to 40-inch control section is between 60 and 85 percent clay.

The Cg horizon has the same range in color as that of the Bg horizon. The texture is silty clay loam, silty clay, or clay.

Ariel Series

The Ariel series consists of nearly level, well drained soils that formed in silty alluvium on flood plains in the hill area of the county. Slopes range from 0 to 2 percent. The soils of the Ariel series are coarse-silty, mixed, thermic Fluventic Dystrochrepts.

Ariel soils are on flood plains with Adler, Morganfield, and Oaklimeter soils. Adler and Oaklimeter soils are slightly lower on flood plains than the Ariel soils. Adler and Morganfield soils do not have a cambic horizon and are nonacid. Oaklimeter soils are moderately well drained and have grayish mottles within a depth of 24 inches.

Typical pedon of Ariel silt, occasionally flooded; in a cultivated field 4 miles north of Vaiden on the Hays Creek flood plain, 1,000 feet west of railroad, and 300 feet south of the gravel road; SE1/4SW1/4 sec. 26, T. 18 N., R. 5 E.

Ap—0 to 5 inches; dark brown (10YR 4/3) silt; weak fine granular structure; friable; common fine roots; very strongly acid; clear smooth boundary.

Bw1—5 to 15 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; few fine roots; very strongly acid; gradual smooth boundary.

Bw2—15 to 29 inches; dark yellowish brown (10YR 4/4) silt loam; few medium faint pale brown (10YR 6/3) mottles; few fine roots; very strongly acid; gradual smooth boundary.

Bw3—29 to 40 inches; dark yellowish brown (10YR 4/4) silt loam; common medium faint pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine roots; few soft dark brown nodules; very strongly acid; gradual smooth boundary.

Eb/B—40 to 51 inches; mottled light brownish gray (10YR 6/2) (E), dark yellowish brown (10YR 4/4) (B), and yellowish brown (10YR 5/4) (B) silt; weak coarse prismatic structure parting to weak medium subangular blocky; gray part friable, brown part slightly compact and brittle; common fine voids; few medium black and brown concretions; very strongly acid; gradual smooth boundary.

Bwxb—51 to 60 inches; mottled light brownish gray (10YR 6/2), dark yellowish brown (10YR 4/4), and yellowish brown (10YR 5/8) silty clay loam; weak coarse prismatic structure parting to weak medium subangular blocky; slightly compact and brittle; few seams of gray silt between prisms; few fine brown concretions; very strongly acid.

The reaction of these soils is very strongly acid or strongly acid except where lime has been added.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4.

The Eb part of the Eb/B horizon has hue of 10YR, value of 5 or 6, and chroma of 2 or 3; the B part has hue of 10YR, value of 4 or 5, and chroma of 3 or 4; or the horizon is mottled in shades of gray and brown. Some pedons have colors of chroma of 2 or less below a depth of 24 inches. The texture of the Eb/B horizon is silt or silt loam. Some pedons do not have an Eb/B horizon.

The Bwxb horizon is mottled in shades of brown or gray or has matrix colors in shades of brown with grayish mottles. It is brittle in 20 to 40 percent of the volume.

The 10- to 40-inch control section contains 12 to 18 percent clay and 3 to 15 percent sand. Depth to a buried solum ranges from 20 to 50 inches. The texture of the horizons in the buried solum is silt loam or silty clay loam.

Arkabutla Series

The Arkabutla series consists of nearly level, somewhat poorly drained soils that formed in silty alluvium. These soils are on flood plains mainly along the Big Black River in the hill area of the county. Slopes range from 0 to 2 percent. The soils of the Arkabutla series are fine-silty, mixed, acid, thermic Aeric Fluvaquents.

Arkabutla soils are on flood plains with Chenneby, Falaya, and Oaklimeter soils. Chenneby soils are at a slightly higher elevation near natural channels and former channels of the river. They are less gray in the upper part of the subsoil than the Arkabutla soils. Falaya and Oaklimeter soils are near tributary streams of the Big Black River and have a coarse-silty control section. In addition, Oaklimeter soils are less gray in the upper part of the subsoil.

Typical pedon of Arkabutla silt loam, frequently flooded; about 3 miles southeast of Vaiden along State Highway 35, and 0.25 mile south of the highway; NE1/4NE1/4 sec. 31, T. 17 N., R. 6 E.

Ap—0 to 5 inches; dark brown (10YR 4/3) silt loam; few fine distinct light brownish gray (10YR 6/2) mottles; weak medium granular structure; friable; common fine roots; strongly acid; abrupt smooth boundary.

Bw—5 to 19 inches; dark brown (10YR 4/3) silt loam; common medium distinct pale brown (10YR 6/3) and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly plastic; few fine roots; few fine soft black concretions; very strongly acid; clear smooth boundary.

Bg1—19 to 27 inches; light brownish gray (10YR 6/2) silt loam; many coarse faint pale brown (10YR 6/3) mottles and common medium distinct dark brown (10YR 4/3) mottles; weak medium subangular

blocky structure; firm, plastic and sticky; few fine roots; common fine brown and black concretions; very strongly acid; clear smooth boundary.

Bg2—27 to 42 inches; gray (10YR 6/1) silty clay loam; many medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm, plastic and sticky; few fine roots; common fine and medium hard brown concretions; very strongly acid; gradual smooth boundary.

Bg3—42 to 60 inches; gray (10YR 6/1) silty clay loam; many medium distinct yellowish brown (10YR 5/8) mottles and common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; firm, plastic and sticky; common fine and medium black and brown concretions; very strongly acid; clear smooth boundary.

The reaction of these soils is very strongly acid or strongly acid except where lime has been added.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. Few to common mottles in shades of brown or gray are in some pedons.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6 with few to many mottles that have chroma of 2 or less; or it is mottled in shades of brown, yellow, and gray.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2, or it is neutral and has value of 4 to 6. Mottles in shades of brown are few to many.

The texture of the 10- to 40-inch control section is silt loam, loam, or silty clay loam. It contains 20 to 35 percent clay and has few to many black and brown concretions.

Bonn Series

The Bonn series consists of nearly level, poorly drained soils that are high in exchangeable sodium. These soils formed in silty material on low terraces and flood plains throughout the county. Slopes are 0 to 1 percent. The soils of the Bonn series are fine-silty, mixed, thermic Glossic Natraqualfs (fig. 19).

Bonn soils are on the same landscape with Adler, Calloway, and Falaya soils. The associated soils are at the same or a slightly higher elevation than the Bonn soils but are mostly in areas drained by natural streams. Adler soils are on flood plains, alluvial fans, and aprons. Falaya soils are on flood plains. These soils are coarse-silty and do not have natric properties. Calloway soils are on uplands and terraces, are better drained, and have a fragipan.

Typical pedon of Bonn silt loam, occasionally flooded; in a field about 1.7 miles northeast of Whaley and 1.2 miles east of State Highway 7; NE1/4SW1/4 sec. 34, T. 21 N., R. 2 E.

Ap—0 to 7 inches; grayish brown (10YR 5/2) silt loam; common medium distinct yellow (10YR 7/6) mottles; weak fine granular structure; friable; many fine roots; yellowish red stains around root channels; very strongly acid; clear smooth boundary.

E—7 to 14 inches; light brownish gray (10YR 6/2) silt loam; many coarse distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; many fine pores; common fine roots; very strongly acid; clear smooth boundary.

E/B—14 to 20 inches; light brownish gray (2.5Y 6/2) silt loam (E); weak medium subangular blocky structure; about 20 percent, by volume, coarse distinct yellowish brown (10YR 5/6) rounded tops of columns (B); weak coarse columnar structure; friable; light gray silt between peds; few varve-like bands in grayish part; few fine roots; moderately alkaline; clear wavy boundary.

B/E—20 to 34 inches; mottled brown (10YR 5/3) (B) and light brownish gray (10YR 6/2) (E) silt loam; few medium distinct yellowish red (5YR 4/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; light brownish gray (10YR 6/2) silt (E part) on most peds and between columns; brown (10YR 5/3) ped interiors; few clay films; few varve-like bands in grayish part; moderately alkaline; clear wavy boundary.

Btg—34 to 52 inches; light brownish gray (2.5Y 6/2) silt loam; many coarse distinct yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; thin light brownish gray (2.5Y 6/2) silt coatings on prisms; yellowish brown (10YR 5/4) ped interiors; few fine brown concretions; few clay films; strongly alkaline; clear wavy boundary.

C—52 to 65 inches; yellowish brown (10YR 5/4) silt loam; few medium distinct pale brown (10YR 6/3) and light brownish gray (10YR 6/2) mottles; massive; friable; few fine black and brown concretions; strongly alkaline.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 to 3. The reaction ranges from very strongly acid to neutral.

The E horizon has hue of 10YR, 2.5Y, or 5Y, value of 5 to 7, and chroma of 1 or 2. The reaction ranges from very strongly acid to neutral. Tongues of E material extend into the Bt horizon.

The Bt horizon has hue of 10YR, 2.5Y, or 5Y. Value of 5 or 6 and chroma of 1 or 2 are in the upper part of the horizon, and value ranging to 4 and chroma to 6 are in the lower part. Mottles are in shades of brown, yellow, and gray. Texture is silt loam or silty clay loam. The reaction ranges from medium acid to strongly alkaline.

Figure 19.—Vegetation is sparse on Bonn silt loam, occasionally flooded, because the high content of sodium in the subsoil restricts the growth of roots.

The C horizon has the same range in color and texture as that of the Bt horizon. The reaction is neutral to strongly alkaline.

Exchangeable sodium ranges from 15 to 50 percent in all horizons below a depth of 16 inches.

Bruno Series

The Bruno series consists of nearly level to gently sloping, excessively drained soils that formed in sandy alluvium on flood plains. Slopes are 0 to 5 percent. The soils of the Bruno series are sandy, mixed, thermic Typic Udifluvents.

Bruno soils are on the same landscape with Adler, Crevasse, Morganfield, and Tutwiler soils. Adler and Morganfield soils are on flood plains, alluvial fans, and aprons. They have a coarse-silty control section. Crevasse soils are in positions similar to those of the Bruno soils but in most places are nearer the streams, inside the levees, or along levee breaks. The Crevasse soils are more sandy. Tutwiler soils are intermingled with Bruno soils on the natural levees and terraces that extend onto the delta. They are coarse-silty and have an argillic horizon.

Typical pedon of Bruno sandy loam, occasionally flooded; about 1 mile southwest of Avalon along State

Highway 7 and 700 feet east of Potacocowa Creek at the county line; SW1/4SW1/4 sec. 28, T. 21 N., R. 2 E.

Ap—0 to 8 inches; yellowish brown (10YR 5/4) sandy loam; common medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5.6) mottles; few fine roots; weak fine granular structure; very friable; neutral; clear smooth boundary.

C1—8 to 13 inches; yellowish brown (10YR 5/4) sand; few thin strata of very fine sandy loam and silt loam in lower part; single grained; loose; neutral; abrupt smooth boundary.

C2—13 to 19 inches; pale brown (10YR 6/3) sand; single grained; loose; neutral; clear smooth boundary.

C3—19 to 35 inches; pale brown (10YR 6/3) sand; few thin strata of dark brown stains; structureless; bedding planes; loose; neutral; clear smooth boundary.

C4—35 to 42 inches; dark yellowish brown (10YR 4/4) sandy loam; thin strata of light yellowish brown (10YR 6/4) and light brownish gray (10YR 6/2) weak platy bedding planes; very friable; few brown concretions; neutral; clear smooth boundary.

C5—42 to 50 inches; pale brown (10YR 6/3) loamy sand; thin strata of light brownish gray (10YR 6/2) and yellowish brown (10YR 5/8); single grained; loose; few fine black and brown concretions; neutral; clear smooth boundary.

C6—50 to 70 inches; light brownish gray (10YR 6/2) silt loam; few medium distinct brown (10YR 5/3) and yellowish brown (10YR 5/8) mottles; weak platy structure; friable; common medium black and brown concretions; neutral.

The reaction of these soils ranges from strongly acid to mildly alkaline.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The texture of the 10- to 40-inch control section is dominantly sand or loamy sand that contains thin strata of loamy very fine sand or finer textures. In some pedons, brownish or grayish mottles are in the lower part of the C horizon.

Calloway Series

The Calloway series consists of nearly level, somewhat poorly drained soils that have a fragipan. These soils formed in silty material on uplands and terraces. Slopes are 0 to 1 percent. The soils of the Calloway series are fine-silty, mixed, thermic Glossaquic Fragiudalfs.

Calloway soils are on the same landscape with Bonn and Grenada soils. Bonn soils are on low terraces and flood plains. They are wetter than the Calloway soils and have high amounts of exchangeable sodium. Grenada soils are in slightly higher positions on uplands and terraces and do not have mottles that have chroma of 2 or less within 16 inches of the surface.

Typical pedon of Calloway silt loam, 0 to 1 percent slopes; from an area 4 miles southwest of Vaiden, 30 feet south of paved road, and 1,800 feet southwest of Peachahala Creek; NE1/4SE1/4 sec. 30, T. 17 N., R. 5 E.

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; few fine roots; strongly acid; abrupt smooth boundary.

B1—6 to 11 inches; yellowish brown (10YR 5/4) silt loam; common medium faint yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine black and brown concretions; few fine pores; very strongly acid; clear smooth boundary.

B2—11 to 15 inches; mottled yellowish brown (10YR 5/8), light brownish gray (10YR 6/2), and pale brown (10YR 6/3) silt loam; weak medium subangular blocky structure; friable; many fine pores; common fine and medium brown concretions; very strongly acid; clear wavy boundary.

E/Btx—15 to 20 inches; light brownish gray (10YR 6/2) silt (E); about 40 percent, by volume, medium distinct yellowish brown (10YR 5/6) B bodies; weak medium subangular blocky structure; friable, brittle and compact in brown part; common fine and medium black and brown concretions; very strongly acid; clear wavy boundary.

Btx1—20 to 26 inches; mottled grayish brown (10YR 5/2), yellowish brown (10YR 5/6), and light brownish gray (10YR 6/2) silt loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle; common clay films on ped faces; gray (10YR 6/1) friable silt coatings in cracks and on prism faces; very strongly acid; clear wavy boundary.

Btx2—26 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; many medium distinct pale brown (10YR 6/3) and light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle; common clay films on ped faces; gray (10YR 6/1) friable silt between prisms and on prism faces; very strongly acid.

Except where lime has been added, the reaction of these soils ranges from very strongly acid to medium acid in the upper part of the solum and from strongly acid to mildly alkaline in the lower part.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4.

The B horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 4 to 6. Few to many mottles in shades of gray are within 16 inches of the surface. Some

pedons are mottled in shades of gray and brown. The texture is silt loam or silty clay loam with a clay content of 18 to 30 percent.

The E part of the E/Btx horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The B part has colors similar to those of the B horizon. Some pedons have an E' horizon that contains little or no brownish, brittle and compact material. The texture of the E/Btx horizon is silt or silt loam.

The Btx horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 6. It has grayish mottles or is mottled in shades of brown, gray, and yellow. The texture is silt loam or silty clay loam.

The Calloway soils in Carroll County are taxadjuncts to the Calloway series because they have more exchangeable sodium in the lower part of the profile than is allowed for the series.

Chenneby Series

The Chenneby series consists of nearly level, somewhat poorly drained soils that formed in silty alluvium. These soils are on broad flood plains mainly along the Big Black River. Slopes range from 0 to 2 percent. The soils of the Chenneby series are fine-silty, mixed, thermic Fluvaquentic Dystrochrepts.

Chenneby soils are on flood plains with Arkabutla, Falaya, and Oaklimeter soils. Arkabutla soils are grayer than the Chenneby soils and are at a slightly lower elevation further from the natural river channels. Falaya and Oaklimeter soils are near tributary streams of the Big Black River. These soils have a coarse-silty control section. Oaklimeter soils are less gray in the upper part of the subsoil.

Typical pedon of Chenneby silt loam, frequently flooded; about 4 miles southeast of Vaiden, 900 feet north of Mississippi Highway 35, and 800 feet east of Big Black River; SW1/4SW1/4 sec. 29, T. 17 N., R. 6 E.

Ap—0 to 6 inches; dark brown (10YR 4/3) silt loam; weak medium granular structure; friable, slightly plastic and sticky; few fine roots; medium acid; clear smooth boundary.

Bw1—6 to 21 inches; dark brown (10YR 4/3) silt loam; few fine faint yellowish brown and pale brown mottles; weak medium subangular blocky structure; friable, slightly plastic and slightly sticky; few fine roots; common fine and medium black and brown concretions; very strongly acid; gradual smooth boundary.

Bw2—21 to 29 inches; dark brown (10YR 4/3) silty clay loam; common fine faint light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly plastic and slightly sticky; common fine black concretions; very strongly acid; gradual smooth boundary.

Bw3—29 to 45 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable, slightly plastic and slightly sticky; common fine and medium black and brown concretions; very strongly acid; gradual smooth boundary.

Bw4—45 to 65 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable, slightly plastic, slightly sticky, and sticky; common fine black and brown concretions; very strongly acid.

The reaction of these soils ranges from very strongly acid to medium acid except where lime has been added.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. Mottles that have chroma of 2 or less are within 24 inches of the surface. Some pedons are mottled in shades of gray, brown, or yellow. The texture is silt loam or silty clay loam, and the clay content in the 10- to 40-inch control section is 18 to 35 percent.

Crevasse Series

The Crevasse series consists of nearly level, excessively drained soils that formed in sandy alluvium. These soils are on flood plains along the slower flowing, less turbulent waters of the inside bends of meandering streams and are also near levee breaks. Slopes range from 0 to 2 percent. The soils of the Crevasse series are mixed, thermic Typic Udipsamments.

Crevasse soils are on the same landscape with Adler and Bruno soils on flood plains. Adler soils are at a higher elevation than the Crevasse soils and have a coarse-silty control section. Bruno soils are at a similar or slightly higher elevation on flood plains and have a sandy control section that has strata of finer textured material.

Typical pedon of Crevasse sand, occasionally flooded; 400 feet north of Big Sand Creek and 900 feet south of C&G Railroad, near Malmaison; SW1/4SE1/4 sec. 7, T. 19 N., R. 3 E.

A—0 to 4 inches; yellowish brown (10YR 5/4) sand; single grained; loose; few fine roots; medium acid; clear smooth boundary.

C1—4 to 10 inches; pale brown (10YR 6/3) sand; single grained; loose; few fine roots; slightly acid; gradual smooth boundary.

C2—10 to 32 inches; light yellowish brown (10YR 6/4) sand; single grained; loose; neutral; gradual smooth boundary.

C3—32 to 60 inches; very pale brown (10YR 6/3) sand; single grained; loose; mildly alkaline.

The reaction of these soils ranges from medium acid to moderately alkaline.

The A horizon has hue of 10YR, value of 4 to 7, and chroma of 2 to 6.

The C horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 6. The texture is sand, fine sand, loamy fine sand, or loamy sand.

Dubbs Series

The Dubbs series consists of nearly level, well drained soils that formed in silty alluvium. These soils are on natural levees bordering former channels and streams of the Mississippi River tributaries. Slopes range from 0 to 2 percent. The soils of the Dubbs series are fine-silty, mixed, thermic Typic Hapludalfs.

Dubbs soils are on the same landscape with Dundee and Forestdale soils. Dundee soils are slightly lower on natural levees than the Dubbs soils and are not as well drained. Forestdale soils are in lower positions on natural levees, are poorly drained, and have a fine control section.

Typical pedon of Dubbs silt loam, 0 to 2 percent slopes; 5.3 miles northwest of Gravel Hill, 3,000 feet southeast of Leflore County line, and 4,300 feet south of gravel road; SE1/4NW1/4 sec. 19, T. 18 N., R. 2 E.

Ap—0 to 5 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; few fine roots; very strongly acid; abrupt smooth boundary.

Bt1—5 to 17 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable; few fine roots; common clay films on ped faces; very strongly acid; clear smooth boundary.

Bt2—17 to 25 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct brown (10YR 5/3) mottles; moderate medium subangular blocky structure; friable; few fine roots; common clay films on ped faces; very strongly acid; clear smooth boundary.

Bt3—25 to 39 inches; dark brown (7.5YR 4/4) silt loam; common medium prominent grayish brown (2.5Y 5/2) mottles; weak medium subangular blocky structure; friable; few fine roots; very strongly acid; gradual smooth boundary.

BC—39 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; common medium prominent grayish brown (2.5Y 5/2) mottles; weak medium subangular blocky structure; friable; few fine black concretions; very strongly acid.

The reaction of these soils ranges from very strongly acid to medium acid except where lime has been added.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. In some pedons, the lower part of this horizon has few to many mottles in shades of gray or brown. The texture is silty clay loam, clay loam, silt loam, or loam. The clay content of the upper 20 inches of the Bt horizon ranges from 20 to 34 percent.

The BC horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. Few to many mottles in shades of gray and brown are in some pedons. The texture is very fine sandy loam, loam, or silt loam.

Dulac Series

The Dulac series consists of sloping to strongly sloping, moderately well drained soils that formed in a thin mantle of silty material underlain by clayey sediment. These soils are on uplands. They have a fragipan above the clayey material. Slopes range from 5 to 12 percent. The soils of the Dulac series are fine-silty, mixed, thermic Typic Fragiudalfs.

Dulac soils are on the same upland landscape with Loring and Providence soils, mostly in scattered areas in the eastern and southeastern parts of the county where thickness of loess and depth to clays is less than 4 feet. Loring soils are on the higher ridges and hillsides and are silty throughout. Providence soils are also on ridgetops and hillsides, but they formed in loess and the underlying loamy material.

Typical pedon of Dulac silt loam, 8 to 12 percent slopes, severely eroded; from a pasture 3 miles south of Vaiden, 200 feet west of gravel road, and 200 feet north of pond levee; NE1/4NW1/4 sec. 1, T. 16 N., R. 5 E.

Ap—0 to 2 inches; yellowish brown (10YR 5/4) silt loam; few medium faint yellowish brown (10YR 5/6) fragments; weak fine granular structure; friable; many fine roots; medium acid; clear smooth boundary.

Bt—2 to 17 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; common clay films on faces of peds; very strongly acid; clear smooth boundary.

Btx1—17 to 26 inches; brown (7.5YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; light brownish gray silt coatings on prisms; firm, compact and brittle; common clay films on faces of peds; very strongly acid; clear smooth boundary.

Btx2—26 to 30 inches; brown (7.5YR 5/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/4) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; prisms coated with light brownish gray silt; firm, compact and

brittle; patchy clay films on faces of peds; very strongly acid; clear smooth boundary.

2Bt1—30 to 35 inches; yellowish red (5YR 4/6) silty clay; common medium distinct strong brown (7.5YR 5/6) and grayish brown (10YR 5/2) mottles; moderate fine angular blocky structure; firm, plastic and sticky; patchy clay films on faces of peds; few fine roots; very strongly acid; clear smooth boundary.

2Bt2—35 to 55 inches; red (2.5YR 4/6) clay; few medium prominent light brownish gray (10YR 6/2) mottles; weak fine angular blocky structure; firm, plastic and sticky; patchy clay films on faces of peds; few fine roots; very strongly acid; clear smooth boundary.

2C—55 to 65 inches; mottled red (2.5YR 4/6), reddish yellow (5YR 6/8), and light brownish gray (10YR 6/2) clay; massive; firm, plastic and sticky; very strongly acid.

The reaction of these soils is very strongly acid or strongly acid except where lime has been added. Depth to the fragipan ranges from 16 to 26 inches, and the depth to the 2Bt horizon ranges from 30 to 53 inches.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The texture is silt loam or silty clay loam. The clay content averages between 25 and 32 percent.

The Btx horizon has hue of 7.5YR or 10YR, value of 4 or 5, chroma of 3 to 6, and has mottles in shades of yellow, brown, red, and gray. Some pedons are profusely mottled in these colors. The texture is silt loam or silty clay loam.

The 2Bt horizon ranges from shades of red to shades of gray with mottles in other colors. The texture is silty clay or clay.

Dundee Series

The Dundee series consists of nearly level, somewhat poorly drained soils that formed in thinly stratified loamy alluvial sediment. These soils are on natural levees that border former channels of Mississippi River tributaries. Slopes range from 0 to 2 percent. The soils of the Dundee series are fine-silty, mixed, thermic Aeric Ochraqualfs.

Dundee soils are on the same landscape with Alligator, Dubbs, Forestdale, and Sharkey soils. Dubbs soils are on higher, slightly rounded ridges of natural levees. Alligator soils are on the adjacent broad, flat flood plains and have a very-fine control section. Forestdale soils are on the lower part of natural levees and have a fine control section. The Alligator and Forestdale soils have a dominately gray subsoil. Sharkey soils are in depressional areas and on flood plains. They also have a grayish subsoil and a very-fine control section.

Typical pedon of Dundee silt loam, 0 to 2 percent slopes; from an area 3,500 feet east of the Leflore County line and 800 feet west of the south end of Third Bridge Lake; SE1/4SE1/4 sec. 26, T. 18 N., R. 1 E.

Ap—0 to 5 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; very strongly acid; clear smooth boundary.

A—5 to 9 inches; dark brown (10YR 4/3) silt loam; common medium faint light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few fine roots; few fine soft brown concretions; very strongly acid; clear smooth boundary.

Btg1—9 to 15 inches; grayish brown (2.5Y 5/2) clay loam; many coarse distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm, plastic and sticky; few fine roots; common clay films on ped faces; very strongly acid; clear smooth boundary.

Btg2—15 to 23 inches; grayish brown (10YR 5/2) clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, plastic and sticky; common clay films on ped faces; very strongly acid; gradual smooth boundary.

BCg—23 to 32 inches; gray (10YR 6/1) loam; moderate medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine soft brown concretions; patchy clay films; strongly acid; gradual smooth boundary.

2Cg1—32 to 44 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; massive; firm, plastic and sticky; common soft black concretions; medium acid; gradual smooth boundary.

2Cg2—44 to 72 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/8) mottles; massive; friable; few fine soft black and brown concretions; neutral.

Except where lime has been added, the reaction of these soils ranges from very strongly acid to medium acid in the A and B horizons and from very strongly acid to neutral in the C horizon.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2. It has common mottles in shades of gray and brown. The texture is silty clay loam, silt loam, clay loam, or loam. The upper 20 inches of this horizon contains 18 to 34 percent clay and more than 15 percent sand, mainly in the very fine sand size fraction.

The Cg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. The texture is loam, silty clay loam, or silt loam. Some pedons have very fine sandy loam, silty clay, or clay below a depth of 40 inches.

Falaya Series

The Falaya series consists of nearly level, somewhat poorly drained soils that formed in silty alluvium on flood plains. Slopes range from 0 to 2 percent. The soils of the Falaya series are coarse-silty, mixed, acid, thermic Aeric Fluvaquents.

Falaya soils are on the same landscape with Arkabutla, Bonn, Chenneby, and Oaklimeter soils. Bonn soils are on low terraces and flood plains. They are grayish and high in exchangeable sodium. Oaklimeter soils are at a slightly higher elevation than the Falaya soils and are not as gray in the upper 20 inches. Arkabutla and Chenneby soils are on the broad, lower-lying parts of the flood plains of the Big Black River and its tributaries. They have a fine-silty control section.

Typical pedon of Falaya silt, occasionally flooded; from an area 7 miles northeast of Vaiden, 500 feet north of State Highway 407, and 100 feet west of Montgomery County; SE1/4NE1/4 sec. 27, T. 18 N., R. 6 E.

Ap—0 to 6 inches; brown (10YR 4/3) silt; few medium faint yellowish brown (10YR 5/4) mottles; weak fine granular structure; friable; few fine roots; slightly acid; clear smooth boundary.

C—6 to 15 inches; brown (10YR 5/3) silt; few medium distinct light brownish gray (10YR 6/2) and grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine and medium soft black and brown concretions; strongly acid; clear smooth boundary.

Cg—15 to 28 inches; gray (10YR 6/1) silt loam; many coarse distinct brown (10YR 4/3) mottles; weak medium subangular blocky structure; friable; few fine roots; few soft brown and black concretions and stains; very strongly acid; clear smooth boundary.

Egb—28 to 40 inches; gray (10YR 6/1) silt loam; common medium distinct brown (10YR 4/3) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine and medium brown concretions; many voids; very strongly acid; clear smooth boundary.

Bgb—40 to 54 inches; mottled light brownish gray (10YR 6/2), yellowish brown (10YR 5/8), and dark grayish brown (10YR 4/2) silt loam; weak medium prismatic structure parting to weak medium subangular blocky; friable, slightly firm; few fine roots; common medium black and brown concretions; very strongly acid; clear smooth boundary.

Btgb—54 to 65 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; common weak coarse prismatic structure parting to weak medium subangular blocky; few clay films; light brownish gray (10YR 6/2) silt between prisms; friable; few fine roots; common soft black concretions; very strongly acid.

The reaction of these soils is very strongly acid or strongly acid except where lime has been added.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4, and mottles in shades of gray and brown. The Cg horizon has a matrix dominated by chroma of 2 or less within 20 inches of the surface. This horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2, and mottles in shades of gray and brown.

The Egb, Bgb, and Btgb horizons have hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2; or they are mottled in shades of gray, brown, and yellow. In some pedons, the lower part of the Btgb horizon is mottled in shades of gray, brown, and yellow, and the texture is silt loam or silty clay loam. The depth to the buried horizons ranges from about 20 to 45 inches or more.

The 10- to 40-inch control section averages 6 to 18 percent clay and less than 10 percent sand.

Forestdale Series

The Forestdale series consists of nearly level, poorly drained soils. These soils formed in clayey and silty materials on the lower part of natural levees bordering former stream channels on the delta. Slopes are 0 to 2 percent. The soils of the Forestdale series are fine, montmorillonitic, thermic Typic Ochraqualfs.

Forestdale soils are on the same landscape with Alligator, Dubbs, Dundee, and Sharkey soils. Alligator soils are in lower positions on flood plains than the Forestdale soils, and the Dundee soils are in higher positions on natural levees. Sharkey soils are in depressional areas and on flood plains. Dubbs soils are on natural levees. Alligator and Sharkey soils have more clay in the 10- to 40-inch control section than the Forestdale soils. The Dubbs and Dundee soils are better drained. In addition, the Dubbs soils have a fine-silty control section.

Typical pedon of Forestdale silt loam; 6.2 miles northwest of Gravel Hill, 2,500 feet south of gravel road, and 225 feet east of Leflore County line; SW1/4NW1/4 sec. 7, T. 18 N., R. 2 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; few fine roots; medium acid; abrupt smooth boundary.

Btg1—6 to 34 inches; light brownish gray (2.5Y 6/2) silty clay; common medium distinct strong brown (7.5YR 5/6) mottles; moderate fine and medium angular and subangular blocky structure; firm, plastic and

sticky; few fine roots; thin patchy clay films; few fine black and brown concretions; strongly acid; gradual smooth boundary.

Btg2—34 to 60 inches; gray (N 5/0) silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm, plastic; thin patchy clay films; few fine black and brown concretions; neutral.

The reaction of these soils ranges from very strongly acid to medium acid in the A horizon and upper part of the Btg horizon except where lime has been added. Below that, the reaction ranges from very strongly acid to mildly alkaline.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2; or it is neutral and has value of 4 to 6.

The Btg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2; or it is neutral and has value of 4 to 7. Few to many mottles in shades of brown or yellow are in this horizon. The texture is silty clay loam, silty clay, or clay. The clay content in the upper 20 inches ranges from 35 to 60 percent, and sand is less than 20 percent.

The Cg horizon has colors similar to those of the Btg horizon. The texture is silt loam or very fine sandy loam. Some pedons do not have a Cg horizon.

Grenada Series

The Grenada series consists of nearly level and gently sloping, moderately well drained soils that have a fragipan. These soils formed in silty material on uplands and terraces. Slopes are 0 to 3 percent. The soils of the Grenada series are fine-silty, mixed, thermic Glossic Fragiudalfs.

Grenada soils are on the same landscape with Calloway and Loring soils. They are in scattered, upland areas and along terraces of the larger streams. Calloway soils are on uplands and terraces and are not as well drained. Loring soils are mainly on uplands and have a single clay maxima above the fragipan.

Typical pedon of Grenada silt loam, 0 to 1 percent slopes; from an area 4 miles north of Vaiden, 1,150 feet south of gravel road, and 1,100 feet west of Hays Creek; SW1/4SW1/4 sec. 26, T. 18 N., R. 5 E.

Ap—0 to 4 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; many fine roots; few yellowish brown root stains; medium acid; clear smooth boundary.

Bw1—4 to 17 inches; yellowish brown (10YR 5/6) silt loam; weak to moderate medium subangular blocky structure; friable; common fine roots; strongly acid; clear smooth boundary.

Bw2—17 to 21 inches; yellowish brown (10YR 5/4) silt loam; common medium faint pale brown (10YR 6/3) mottles; weak to medium subangular blocky structure; friable; few fine roots; common voids; few fine brown concretions; very strongly acid; clear smooth boundary.

E/B—21 to 25 inches; light brownish gray (10YR 6/2) silt (65 percent) (E) and yellowish brown (10YR 5/6) silt loam (35 percent) (B); weak fine subangular blocky structure; light brownish gray part friable; yellowish brown part firm, compact and brittle; few fine roots; many voids; few brown concretions; very strongly acid; clear wavy boundary.

Btx1—25 to 33 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct pale brown (10YR 6/3) and light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle; common clay films on ped faces; few voids lined with clay; gray (10YR 6/1) silt between prisms; few brown concretions; strongly acid; clear wavy boundary.

Btx2—33 to 50 inches; yellowish brown (10YR 5/6) silt loam; common medium distinct pale brown (10YR 6/3) and light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle; patchy clay films; gray (10YR 6/1) silt between prisms; few black concretions; strongly acid; clear wavy boundary.

Btx3—50 to 70 inches; brown (7.5YR 4/4) silt loam; common medium distinct pale brown (10YR 6/3) and light brownish gray (10YR 6/2) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm, compact and brittle; patchy clay films; gray (10YR 6/1) silt in seams between prisms; few black concretions; strongly acid.

The reaction of these soils ranges from very strongly acid to medium acid in the A, Bw, E/B, and upper part of the Btx horizons except where lime has been added. It ranges from strongly acid to neutral in the lower part of the Btx horizon.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The Bw horizon has hue of 10YR, value of 4 to 6, and chroma of 4 to 6. It commonly has few to common brownish mottles. The texture is silt loam or silty clay loam. The content of clay is 18 to 30 percent, and sand is less than 10 percent.

The E part of the E/B horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is silt or silt loam. The B part is similar to the underlying Btx horizon.

The Btx horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6; or it has hue of 7.5YR, value of 4 or 5, and chroma of 4. Mottles are in shades of gray and brown. The texture is silt loam or silty clay loam. The content of clay is no more than 32 percent.

Lexington Series

The Lexington series consists of moderately steep to steep, well drained soils that formed in silty material and the underlying loamy material. These soils are in the central and eastern part of the county on upland hillsides. Slopes are 12 to 20 percent. The soils of the Lexington series are fine-silty, mixed, thermic Typic Paleudalfs.

Lexington soils are on the same landscape and are mapped in association with Providence and Smithdale soils. Providence soils are on uplands on ridgetops; they have a fragipan. Smithdale soils are on uplands mostly on middle and lower parts of hillsides. They have a higher sand content throughout the solum than the Lexington soils.

Typical pedon of Lexington silt loam from an area of Smithdale-Providence-Lexington association, hilly; about 7.3 miles north of Carrollton, 300 feet east of gravel road, and 200 feet south of pipeline; NE1/4SW1/4 sec. 8, T. 20 N., R. 4 E.

O—1 to 0 inches; partly decayed mat of leaves, twigs, stems, and roots.

A1—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine roots; very strongly acid; clear smooth boundary.

A2—2 to 4 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; common fine roots; very strongly acid; clear smooth boundary.

Bt1—4 to 9 inches; dark brown (7.5YR 4/4) silty clay loam; few medium faint dark brown (10YR 4/3) mottles; moderate medium subangular blocky structure; friable; few fine roots; common clay films on face of peds; very strongly acid; gradual smooth boundary.

Bt2—9 to 25 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; continuous clay films on face of peds; few fine soft brown concretions; very strongly acid; gradual smooth boundary.

Bt3—25 to 35 inches; dark brown (7.5YR 4/4) silt loam; common medium distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable; few fine roots; common clay films on face of peds; few fine soft brown concretions; very strongly acid; clear smooth boundary.

2Bt1—35 to 53 inches; dark brown (7.5YR 4/4) loam; common medium distinct pale brown (10YR 6/3) silt coatings on ped faces; weak medium subangular blocky structure; friable; few fine roots; sand grains coated and bridged with clay; very strongly acid; gradual smooth boundary.

2Bt2—53 to 70 inches; dark brown (7.5YR 4/4) sandy loam; common medium distinct pale brown (10YR 6/3) coatings and pockets of uncoated sand; weak medium subangular blocky structure; very friable; sand grains coated and bridged with clay; very strongly acid.

The reaction of these soils ranges from very strongly acid to medium acid except where lime has been added.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6.

The Bt horizon has hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 4 to 6. The texture is silt loam or silty clay loam. Clay content is 18 to 35 percent. The upper part of the Bt horizon has less than 15 percent sand, and the amount of sand increases with depth.

The 2Bt horizon has hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 3 to 8. The texture is loam or sandy loam. The depth to a layer containing more than 15 percent sand ranges from 30 to 48 inches. Thin pockets of uncoated sand grains are few to common.

Loring Series

The Loring series consists of gently sloping to steep, moderately well drained soils that have a fragipan. These soils formed in silty material on uplands. Slopes are 2 to 20 percent. The soils of the Loring series are fine-silty, mixed, thermic Typic Fragiudalfs.

Loring soils are on the same landscape with Dulac, Grenada, Maben, Memphis, and Providence soils. Dulac soils are on uplands and have clayey material in the lower part of the profile. Grenada soils are on uplands and terraces, have an E/B horizon above the fragipan, and are nearly void of clay films in the Bw horizon. Maben soils are on uplands and are clayey. Memphis soils are on uplands and terraces and do not have a fragipan. Providence soils are on uplands and contain more sand in the lower part of the profile than the Loring soils.

Typical pedon of Loring silt loam, 5 to 8 percent slopes, eroded; 6 miles southwest of Carrollton and 35 feet south of a gravel road; NW1/4NE1/4 sec. 5, T. 18 N., R. 3 E.

Ap—0 to 5 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; very strongly acid; clear smooth boundary.

BE—5 to 9 inches; brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

Bt1—9 to 19 inches; brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; common clay films on faces of peds; very strongly acid; gradual smooth boundary.

Bt2—19 to 24 inches; brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; common clay films on ped

faces; few fine dark brown splotches; very strongly acid; clear smooth boundary.

Btx1—24 to 42 inches; brown (7.5YR 4/4) silt loam; common medium distinct dark yellowish brown (10YR 4/4) and light brownish gray (10YR 6/2) mottles; coarse prisms 4 to 6 inches across separated by 0.25 to 1 inch seams of pale brown (10YR 6/3) silt parting into weak medium subangular blocky structure; firm, compact and brittle prisms make up 60 percent of cross section; patchy clay films on faces of peds in prisms; few voids with clay linings; few roots in seams; common fine and medium black concretions; very strongly acid; gradual smooth boundary.

Btx2—42 to 48 inches; brown (7.5YR 4/4) and dark yellowish brown (10YR 4/4) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; coarse prisms 4 to 7 inches across parting to weak medium subangular blocky structure; seams of pale brown (10YR 6/3) silt between prisms; firm, compact and brittle prisms make up 70 percent of cross section; few voids; few fine black concretions; very strongly acid; gradual smooth boundary.

C—48 to 65 inches; brown (7.5YR 4/4) silt loam; common medium pale brown (10YR 6/3) and light brownish gray (10YR 6/2) mottles; pale brown (10YR 6/3) silty material in cracks; massive; friable; few fine black splotches; very strongly acid.

The reaction of these soils ranges from very strongly acid to medium acid in the A, BE, and B horizons and from very strongly acid to slightly acid in the C horizon.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6.

The BE horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. Some pedons do not have a BE horizon.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. Grayish mottles are in the lower part of the Bt horizon of some pedons. The texture is silt loam or silty clay loam, and the clay content is 18 to 32 percent.

The Btx horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6 with mottles in shades of brown and gray; or it is mottled in shades of gray, brown, and yellow. The texture is silt loam or silty clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6 and has mottles in shades of brown and gray.

Sand content throughout the solum is less than 15 percent. Depth to the fragipan generally ranges from 20 to 35 inches. In severely eroded areas, the fragipan may be at a depth of less than 20 inches.

Maben Series

The Maben series consists of strongly sloping to steep, well drained soils. These soils formed in stratified marine sediment on uplands. The sediment consists of loamy materials, clays, and shaly clays. Slopes range from 8 to 20 percent. The soils of the Maben series are fine, mixed, thermic Ultic Hapludalfs.

Maben soils are on the same landscape with Loring, Memphis, and Smithdale soils. Loring soils are on uplands on upper parts of hillsides and ridgetops. Memphis soils are on uplands and terraces. The Loring and Memphis soils have a fine-silty control section. Smithdale soils are on uplands and have a fine-loamy control section.

Typical pedon of Maben silt loam from a forested area of Maben-Memphis complex, 8 to 20 percent slopes; 7 miles south of Carrollton, 1,200 feet north of intersection of gravel roads, 150 feet east of road under power line; NW1/4NW1/4 sec. 20, T. 18 N., R. 4 E.

A—0 to 3 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine and medium roots; medium acid; clear smooth boundary.

Bt1—3 to 12 inches; yellowish red (5YR 5/8) clay; few medium distinct yellowish brown (10YR 5/6) mottles; moderate fine angular blocky structure; firm, plastic and sticky; common fine roots; continuous clay films on ped faces; very strongly acid; clear smooth boundary.

Bt2—12 to 22 inches; yellowish red (5YR 5/8) clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate fine angular blocky structure; firm, plastic and sticky; few fine roots; continuous clay film on ped faces; few fine distinct pale brown fragments of partly weathered shale; very strongly acid; gradual smooth boundary.

BC—22 to 36 inches; mottled yellowish red (5YR 5/8), pale brown (10YR 6/3), and yellowish brown (10YR 5/8) clay; weak fine angular blocky structure; firm, plastic and sticky; few fine roots; few fine mica flakes; common grayish brown (2.5Y 5/2) soft partly weathered laminated shaly materials; few sandstone fragments; very strongly acid; gradual smooth boundary.

C—36 to 60 inches; thinly stratified light brownish gray (2.5Y 6/2) partly weathered shale and yellowish red (5YR 5/8) fine sandy loam; massive; weak platy rock structure; firm, plastic and sticky; few fine roots between plates; few fine mica flakes; very strongly acid.

The reaction of these soils is medium acid or slightly acid in the A horizon and very strongly acid to medium acid in the B and C horizons. Depth to the C horizon ranges from 20 to 48 inches.

The A horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 3 or 4.

The Bt horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 4 to 8. Mottles in shades of brown and yellow are in some pedons. The texture is clay, silty clay

loam, or clay loam. The upper 20 inches of the Bt horizon ranges from 35 to 55 percent clay.

The BC horizon is a transitional zone between the Bt and C horizons. It has colors similar to those of the Bt horizon but contains grayish, soft, partly weathered laminated shale fragments. The texture is clay, silty clay, clay loam, or sandy clay loam.

The C horizon has colors similar to those of the Bt horizon, or it is thinly stratified in shades of red, gray, and yellow. The texture is clay, clay loam, silty clay loam, loam, sandy clay loam, or fine sandy loam. Content of partly weathered shale makes up to 50 percent of the C horizon in some pedons.

Memphis Series

The Memphis series consists of nearly level to steep, well drained soils that formed in silty material on uplands and terraces. Slopes range from 0 to 40 percent. The soils of the Memphis series are fine-silty, mixed, thermic Typic Hapludalfs.

Memphis soils are on uplands with Loring, Maben, Natchez, and Saffell soils. Loring soils have a brittle and compact fragipan. Maben soils have a clayey control section. Natchez soils have a coarse-silty control section and are mainly in a band a few miles wide along the bluff area. Saffell soils formed in loamy material that is high in gravel content.

Typical pedon of Memphis silt loam, 0 to 2 percent slopes; 3.5 miles northeast of Avalon, 1,000 feet southeast of a gravel road, and 1,300 feet north of Patococowa Creek; SW1/4NW1/4 sec. 19, T. 21 N., R. 3 E.

Ap—0 to 4 inches; yellowish brown (10YR 5/4) silt loam; few medium faint dark yellowish brown (10YR 4/4) mottles; weak fine granular structure; friable; few fine roots; medium acid; abrupt smooth boundary.

Bt1—4 to 19 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; continuous clay film on ped faces; medium acid; clear smooth boundary.

Bt2—19 to 40 inches; dark brown (7.5YR 4/4) silt loam; few medium distinct pale brown (10YR 6/3) silt coatings; moderate medium subangular blocky structure; friable; few fine roots; patchy clay films; few fine soft black concretions; very strongly acid; gradual smooth boundary.

Bt3—40 to 62 inches; dark brown (7.5YR 4/4) silt loam; common pale brown (10YR 6/3) silt coatings; weak medium subangular blocky structure; friable; few patchy clay films; few fine black concretions; very strongly acid; gradual smooth boundary.

C—62 to 90 inches; dark brown (7.5YR 4/4) silt loam; common pale brown (10YR 6/3) silt coatings in cracks; massive; friable; few fine black concretions; medium acid.

The reaction of these soils ranges from very strongly acid to medium acid except where lime has been added.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 4; or hue of 7.5YR, value of 4 or 5, and chroma of 4.

The Bt and C horizons have hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. The texture is silt loam or silty clay loam. Clay content in the upper 20 inches of the Bt horizon ranges from 20 to 35 percent. The soil to a depth of 48 inches or more contains less than 5 percent sand. Black coatings and stains on ped faces of the Bt horizon range from few to many. In some pedons, gray or pale brown silt coatings are in cracks and on faces of peds.

Morganfield Series

The Morganfield series consists of nearly level, well drained, nonacid soils that formed in silty alluvium. These soils are on flood plains, alluvial fans, and aprons extending into the delta. Slopes range from 0 to 2 percent. The soils of the Morganfield series are coarse-silty, mixed, nonacid, thermic Typic Udifluvents.

Morganfield soils are on the same landscape with Adler, Ariel, and Bruno soils. Adler soils are slightly lower on flood plains, alluvial fans, and aprons than the Morganfield soils and have grayish mottles within a depth of 20 inches. Ariel soils are on flood plains. They are acid and have a cambic horizon. Bruno soils are on alluvial fans, aprons, and flood plains nearer streams and levee breaks. They have a sandy control section.

Typical pedon of Morganfield silt loam, occasionally flooded; from an area 2.5 miles southwest of Gravel Hill, 2,500 feet east of power line, and 2,100 feet north of Coila Creek; SW1/4NE1/4 sec. 34, T. 18 N., R. 2 E.

Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; few fine roots; friable; medium acid; abrupt smooth boundary.

C1—6 to 18 inches; dark yellowish brown (10YR 4/4) silt loam; common medium faint yellowish brown (10YR 5/4) mottles; structureless, prominent bedding planes; friable; neutral; clear smooth boundary.

C2—18 to 27 inches; dark brown (10YR 4/3) silt loam; common medium faint brown (10YR 5/3) mottles; structureless, thin bedding planes; friable; neutral; gradual smooth boundary.

C3—27 to 60 inches; dark brown (10YR 4/3) silt loam; structureless; few thin strata of sandy loam; friable; slightly acid.

The reaction of these soils ranges from medium acid to mildly alkaline. Total sand content ranges from 5 to 45 percent with less than 15 percent coarser than very fine sand. Some pedons have a buried A horizon below a depth of 20 inches.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. In some pedons, this horizon has few to many brownish mottles above a depth of 20 inches. Mottles in shades of gray or brown are below a depth of 20 inches in some pedons. The lower part of the C horizon in some pedons is mottled in shades of brown, gray, and yellow. The texture of the C horizon is silt, silt loam, or very fine sandy loam. Clay content of the 10- to 40-inch control section ranges from 5 to 18 percent.

Natchez Series

The Natchez series consists of moderately steep to steep, well drained soils that formed in silty material on uplands. These soils are mainly confined to a band a few miles wide along the bluff area. Slopes range from 12 to 45 percent. The soils of the Natchez series are coarse-silty, mixed, thermic Typic Eutrochrepts.

Natchez soils are on the same landscape with Memphis and Saffell soils. Memphis soils are on ridgetops and upper and middle parts of hillsides. They have a fine-silty control section, and are more acid in the upper horizons than the Natchez soils. Saffell soils are on steep middle and lower parts of hillsides. They have a skeletal control section, and the gravel content is high.

Typical pedon of Natchez silt loam in an area of Natchez-Saffell association, hilly; 3.5 miles northwest of Gravel Hill, along unpaved road 800 feet east of base of bluffs and 1,400 feet south of Abotcaputa Creek; NE1/4 NW1/4 sec. 10, T. 18 N., R. 2 E.

O—1 to 0 inches; partly decayed, matted leaves and twigs.

A1—0 to 2 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine to coarse roots; strongly acid; clear smooth boundary.

A2—2 to 6 inches; yellowish brown (10YR 5/4) silt; weak medium subangular blocky structure; friable; common fine to coarse roots; strongly acid; gradual smooth boundary.

Bw—6 to 22 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; common fine and medium roots; medium acid; gradual smooth boundary.

C—22 to 78 inches; dark yellowish brown (10YR 4/4) silt; structureless, massive; friable; few fine roots; common fine to coarse calcium carbonate concretions and nodules; few fine and medium shells; neutral.

The reaction of these soils ranges from strongly acid to neutral in the A and B horizons and from neutral to moderately alkaline in the C horizon.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. The texture is silt or silt loam.

The Bw horizon has hue of 10YR, value of 4 to 6, and chroma of 3 to 6. The texture is silt or silt loam, and the clay content in the 10- to 40-inch control section ranges from 7 to 18 percent. Sand is less than 10 percent.

The C horizon is similar in color and texture to the B horizon. Shell fragments range from few to many.

Oaklimeter Series

The Oaklimeter series consists of nearly level, moderately well drained soils that formed in silty alluvium on flood plains. Slopes range from 0 to 2 percent. The soils of the Oaklimeter series are coarse-silty, mixed, thermic Fluvaquentic Dystrochrepts.

Oaklimeter soils are on the same landscape with Ariel, Arkabutla, Chenneby, and Falaya soils. Ariel soils are slightly higher on flood plains than the Oaklimeter soils and do not have chroma 2 or less mottles within 24 inches of the surface. Arkabutla and Chenneby soils are on flood plains. They are somewhat poorly drained and have a fine-silty control section. Falaya soils are on flood plains in the lower-lying areas and have grayer colors in the upper part of the B horizon.

Typical pedon of Oaklimeter silt loam, occasionally flooded; from an area 1.5 miles north of Vaiden, 1,200 feet southwest of gravel road, and 1,500 feet east of Hays Creek; NW1/4NE1/4 sec. 11, T. 17 N., R. 5 E.

Ap—0 to 7 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

Bw1—7 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

Bw2—14 to 23 inches; dark brown (10YR 4/3) silt loam; few medium distinct light brownish gray (2.5Y 6/2) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

Bw3—23 to 33 inches; dark brown (10YR 4/3) silt loam; few medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; many medium soft black concretions; strongly acid; clear smooth boundary.

B/Eb—33 to 50 inches; mottled dark yellowish brown (10YR 4/4) and brown (10YR 5/3) (B) and light brownish gray (10YR 6/2) (E) silt loam; weak medium subangular blocky structure; friable; common fine brown and black concretions; strongly acid; clear wavy boundary.

Btgb—50 to 65 inches; mottled light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) silt loam; weak coarse prismatic structure parting to weak medium subangular blocky; slightly brittle and compact; few fine black concretions; very strongly acid.

The reaction of these soils is very strongly acid or strongly acid except where lime has been added.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The Bw1 horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Grayish or brownish mottles range from none to common. The Bw2 and Bw3 horizons have colors similar to those of the Bw1 horizon except that grayish mottles are few to many, or these horizons are mottled in shades of brown and gray. The texture of the Bw horizon is silt loam, very fine sandy loam, silt, or loam. Clay content of the particle-size control section ranges from 7 to 18 percent.

The B/Eb and Btgb horizons have hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2; or they are mottled in shades of brown and gray. The texture is silt loam or silty clay loam. Black and brown concretions range from none to many.

Providence Series

The Providence series consists of sloping to moderately steep, moderately well drained soils that have a fragipan (fig. 20). These soils formed in silty material underlain by loamy material. They are on uplands. Slopes are 5 to 15 percent. The soils of the Providence series are fine-silty, mixed, thermic Typic Fragiudalfs.

Providence soils are on the same landscape with Dulac, Lexington, Loring, and Smithdale soils. Dulac soils are underlain by clayey material. Lexington soils do not have a fragipan. Loring soils are silty throughout the profile. Smithdale soils have a fine-loamy control section.

Typical pedon of Providence silt loam, 8 to 12 percent slopes, severely eroded; from an area 2.5 miles northwest of Vaiden, 3,250 feet northeast of State Highway 35, and 30 feet north of gravel road; NE1/4SW1/4 sec. 32, T. 18 N., R. 5 E.

Ap—0 to 3 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium granular structure; friable; few fine roots; strongly acid; clear smooth boundary.

Bt1—3 to 15 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; continuous clay film on peds; friable; few fine roots; strongly acid; clear smooth boundary.

Bt2—15 to 21 inches; strong brown (7.5YR 5/6) silt loam; common medium distinct pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm, slightly compact and brittle; continuous clay film on peds; few fine soft brown concretions; common voids; strongly acid; clear wavy boundary.

Btx—21 to 34 inches; strong brown (7.5YR 5/6) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle; continuous clay film on peds; few fine black and brown concretions; pale brown silt between prisms; strongly acid; gradual wavy boundary.

2Btx—34 to 42 inches; strong brown (7.5YR 5/6) loam; common medium distinct grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle; common clay films on peds; few fine black and brown concretions; pale brown silt in seams; strongly acid; clear smooth boundary.

Figure 20.—Providence silt loam has a fragipan in the lower part of the subsoil. The fragipan restricts roots.

2Bt—42 to 65 inches; reddish brown (5YR 4/4) sandy loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; friable; few clay films on peds; clay bridging and coating on sand grains; strongly acid.

The reaction of these soils ranges from very strongly acid to medium acid except where lime has been added.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 3. The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 3 to 6.

The Bt horizon has hue of 10YR, 7.5YR, or 5YR, value of 4 or 5, and chroma of 4 to 8. Few to common brownish mottles are in some pedons. The texture is silt loam or silty clay loam. The content of clay averages 20 to 30 percent and sand is 5 to 15 percent.

The Btx and 2Btx horizons have hue of 5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 6 to 8 with mottles in shades of gray, brown, and red; or it is mottled in shades of these colors. The texture of the Btx horizon is silt loam or silty clay loam. The 2Btx horizon contains evident amounts of sand. It is silt loam, silty clay loam, sandy clay loam, loam, or sandy loam. Concretions range from none to many.

The 2Bt horizon ranges in color from red to gray. The texture is sandy loam, silt loam, loam, sandy clay loam, or clay loam.

Depth to the fragipan ranges from 18 to 38 inches. More than 15 percent sand is within 48 inches of the surface.

Saffell Series

The Saffell series consists of steep, well drained soils that formed in loamy material on uplands. The content of gravel is high in these soils. Slopes range from 17 to more than 45 percent. The soils of the Saffell series are loamy-skeletal, siliceous, thermic Typic Hapludults.

Saffell soils are on the same landscape with Memphis and Natchez soils. Memphis and Natchez soils are silty and do not contain large amounts of gravel and sand.

Typical pedon of Saffell fine sandy loam, in an area of the Natchez-Saffell association, hilly; 3.5 miles northwest of Gravel Hill along gravel road, on roadbank on north side of road; NW1/4SE1/4 sec. 3, T. 18 N., R. 2 E.

O—1 to 0 inches; partly decayed, matted leaves and twigs.

A—0 to 4 inches; dark brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; about 10 percent, by volume, pebbles; strongly acid; clear smooth boundary.

E—4 to 9 inches; yellowish brown (10YR 5/4) gravelly sandy loam; weak medium granular structure; friable; many fine and medium roots; about 20 percent, by volume, pebbles; strongly acid; clear smooth boundary.

Bt1—9 to 17 inches; strong brown (7.5YR 5/8) very gravelly fine sandy loam; weak medium subangular blocky structure; friable; common clay films on faces of peds; sand grains coated and bridged with clay; common fine and medium roots; about 40 percent, by volume, pebbles; strongly acid; clear smooth boundary.

Bt2—17 to 25 inches; dark brown (7.5YR 4/4) very gravelly sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; about 60 percent, by volume, pebbles; common clay films on faces of peds; sand grains coated and bridged with clay; strongly acid; clear smooth boundary.

Bt3—25 to 37 inches; dark brown (7.5YR 4/4) very gravelly sandy loam; weak medium subangular blocky structure; friable; common fine and medium roots; about 60 percent, by volume, pebbles; patchy clay films on faces of peds; sand grains coated and bridged with clay; strongly acid; clear smooth boundary.

C—37 to 60 inches; yellowish brown (10YR 5/6) very gravelly loamy sand; massive; loose; common fine and medium roots; about 60 percent, by volume, pebbles; strongly acid.

The reaction of these soils is very strongly acid or strongly acid except where lime has been added.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. Gravel content ranges from 1 to 35 percent.

The E horizon has hue of 10YR or 7.5YR, value of 4 to 5, and chroma of 2 to 6. The texture is fine sandy loam, sandy loam, or loamy fine sand, or their gravelly analogs. Gravel content ranges from 1 to 35 percent.

The Bt horizon has hue of 7.5YR, 5YR, or 2.5YR, value of 4 to 6, and chroma of 4 to 8. The texture is gravelly sandy clay loam, very gravelly loam, very gravelly fine sandy loam, or very gravelly clay loam. Gravel content ranges from 35 to 65 percent. The upper 20 inches of the Bt horizon has 12 to 35 percent clay.

The C horizon has the same range in color as that of the Bt horizon, or it is mottled in shades of red, brown, or yellow. The texture is gravelly loamy sand, gravelly sandy loam, very gravelly loamy sand, very gravelly sandy loam, or gravelly sandy clay loam. The gravel content is 20 to 80 percent.

Sharkey Series

The Sharkey series consists of nearly level, poorly drained soils that formed in clayey slack water sediment of the Mississippi River. These soils are on flood plains and in depressional areas of the delta. Slopes are 0 to 2 percent. The soils of the Sharkey series are very-fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts.

Sharkey soils are on the same landscape with Alligator, Dundee, and Forestdale soils. Alligator soils are on broad, flat flood plains and are acid. Dundee soils are on natural levees, and Forestdale soils are on lower parts of natural levees and have better surface drainage than the Sharkey soils.

Typical pedon of Sharkey clay, frequently flooded; from an area 6.7 miles west of Gravel Hill, 1 mile east of Leflore County line, and 2,100 feet south of gravel road; NW1/4NW1/4 sec. 25, T. 18 N., R. 1 E.

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) clay; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium granular structure; firm, very plastic and sticky; few fine roots; strongly acid; clear smooth boundary.

Bg1—4 to 16 inches; gray (10YR 5/1) clay; common medium distinct dark brown (10YR 4/3) and strong brown (7.5YR 5/8) mottles; moderate medium angular and subangular blocky structure; very firm, plastic and sticky; shiny faces on peds; few fine roots; few fine black concretions; medium acid; gradual smooth boundary.

Bg2—16 to 33 inches; gray (5Y 5/1) clay; common medium prominent yellowish red (5YR 5/8) mottles; moderate medium angular blocky structure; very firm, plastic and sticky; shiny faces on peds; few fine roots; few fine black concretions; medium acid; gradual smooth boundary.

Bg3—33 to 50 inches; gray (5Y 5/1) clay; common medium prominent yellowish red (5YR 5/8) mottles; weak fine angular blocky structure; few nonintersecting slickensides; very firm, plastic and sticky; shiny faces on peds; few fine black concretions; neutral; gradual smooth boundary.

Cg—50 to 70 inches; gray (5Y 5/1) clay; common fine prominent yellowish brown (10YR 5/6) mottles; massive; very firm, plastic and sticky; few nonintersecting slickensides; common medium black concretions; moderately alkaline.

The reaction of these soils ranges from strongly acid to moderately alkaline in the A horizon, from medium acid to moderately alkaline in the B horizon, and from neutral to moderately alkaline in the C horizon.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2.

The Bg horizon has hue of 5Y, 2.5Y, or 10YR, value of 4 to 6, and chroma of 1 or 2; or it is neutral and has value of 4 to 6. It has mottles in shades of brown, yellow, or red. Clay content averages from 60 to 90 percent.

The Cg horizon has colors similar to those of the Bg horizon. The texture is clay or silty clay.

Smithdale Series

The Smithdale series consists of moderately steep to hilly, well drained soils that formed in loamy material. These soils are on uplands in the central and eastern parts of the county. Slopes range from 12 to 40 percent. The soils of the Smithdale series are fine-loamy, siliceous, thermic Typic Hapludults.

Smithdale soils are on the same upland landscape with Lexington, Maben, and Providence soils. Providence and Lexington soils are on ridgetops and upper slopes and have a fine-silty control section. Maben soils have a fine control section.

Typical pedon of Smithdale sandy loam, 12 to 30 percent slopes, eroded; 5.5 miles east of Vaiden, and 1,500 feet west of Montgomery County on east bank of unpaved road; SE1/4SE1/4 sec. 10, T. 17 N., R. 6 E.

Ap1—0 to 3 inches; dark brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; many fine roots; medium acid; clear smooth boundary.

Ap2—3 to 8 inches; yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; very friable; common fine roots; medium acid; clear smooth boundary.

Bt1—8 to 21 inches; red (2.5YR 4/8) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; common clay films on peds; very strongly acid; gradual smooth boundary.

Bt2—21 to 45 inches; red (2.5YR 4/8) sandy loam; weak medium subangular blocky structure; friable; few fine roots; sand grains coated and bridged with clay; very strongly acid; gradual smooth boundary.

Bt3—45 to 63 inches; red (2.5YR 5/8) sandy loam; weak medium subangular blocky structure; friable; few pockets of yellowish red (5YR 5/6) loamy sand; sand grains in red part coated and bridged with clay; very strongly acid; gradual smooth boundary.

Bt4—63 to 80 inches; red (2.5YR 4/8) sandy loam; weak medium subangular blocky structure; very friable; few pockets of yellowish red (5YR 5/6) loamy sand and pale brown (10YR 6/3) sand; sand in red part coated and bridged with clay; very strongly acid.

The reaction of these soils is very strongly acid or strongly acid except where lime has been added.

The Ap horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 2 to 6. Some pedons have an A horizon that has hue of 7.5YR or 10YR, value of 4, and chroma of 1 to 3.

Some pedons have an E horizon that has hue of 10YR, value of 5 or 6, and chroma of 2 to 4. The texture is fine sandy loam, sandy loam, loamy fine sand, loam, or loamy sand.

The upper part of the Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. The texture is clay loam, sandy clay loam, or loam. The upper 20

inches of the Bt horizon has 18 to 33 percent clay and 15 to 45 percent silt. The lower part of the Bt horizon has the same range in color as that of the upper part except that some pedons have few to many pockets of uncoated loamy sand or loamy materials. It is loam or sandy loam. Some pedons may have as much as 5 to 10 percent ironstone fragments.

Tutwiler Series

The Tutwiler series consists of nearly level to gently sloping, well drained soils that formed in loamy material. These soils are on natural levees and terraces on the delta. Slopes range from 0 to 5 percent. The soils of the Tutwiler series are coarse-silty, mixed, thermic Typic Hapludalfs.

Tutwiler soils are intermingled and on the same landscape with Bruno soils, which have a sandy particle-size control section. The Bruno soils are on the alluvial fans that extend onto the delta and adjacent to the bluffs.

Typical pedon of Tutwiler very fine sandy loam from an area of Bruno-Tutwiler complex; 0.5 mile north of Teoc and 200 feet west of gravel road; NE1/4NW1/4 sec. 23, T. 20 N., R. 2 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) very fine sandy loam; weak fine granular structure; very friable; many fine roots; few medium gravel; neutral; clear smooth boundary.

Bt1—5 to 9 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; few fine roots; thin clay films and bridging of sand grains; medium acid; clear smooth boundary.

Bt2—9 to 24 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; thin clay films and clay bridging of sand grains; few fine roots; medium acid; gradual smooth boundary.

Bt3—24 to 47 inches; dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; thin patchy clay films and clay bridging of sand grains; few fine roots; medium acid; gradual smooth boundary.

2C—47 to 60 inches; dark brown (10YR 4/3) fine sandy loam; many coarse faint dark yellowish brown (10YR 4/4) mottles; structureless; friable; medium acid.

The solum ranges from 20 to 48 inches in thickness. The reaction of the soil ranges from very strongly acid to medium acid except where lime has been added.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6. The texture is loam, silt loam, or fine sandy loam. The upper 20 inches of the Bt horizon averages 8 to 18 percent clay. It has a high sand content, but less than 15 percent is coarser than very fine sand.

The 2C horizon has the same range in color as that of the Bt horizon. The texture is loamy very fine sand or fine sandy loam. Few to many brownish mottles are in some pedons.

Formation of the Soils

This section describes the factors of soil formation and the geology, relates them to the formation of the soils in Carroll County, and explains the processes of soil formation.

Factors of Soil Formation

The characteristics of the soil at any given place are determined by the nature of the parent material, relief, climate, living organisms, and time. All of these factors affect the formation of every soil. The relative importance of each differs from place to place. In extreme cases, one factor may dominate in the formation of the soil and fix most of its properties. This is common when the parent material consists of pure quartz sand. Little can happen to quartz sand, and the soils derived from it generally have faint horizons. Even in quartz sand, however, distinct profiles can be formed under certain types of vegetation where the topography is low and nearly level and the water table is high.

The five soil-forming factors are interdependent; each modifies the effects of the others. Climate and living organisms are the active factors of soil formation. They act on parent material and gradually change it into a natural body that has genetically related horizons. Relief largely controls runoff and, therefore, influences the effectiveness of climate and vegetation. Finally, time is needed to change parent material into a soil. The past combination of the five factors and their interaction have determined the present character of each soil.

Parent Material

The parent materials of soils in Carroll County were transported by wind, sea, or streams. The parent material controls the texture and mineralogy of most soils. Soil drainage and soil color are also influenced by it. If the deposited sediment is loamy, the soils that develop are loamy. Clayey sediment that is high in montmorillonite develops into clayey soils that have montmorillonitic mineralogy. Some changes occur in the texture of the raw material during soil development, but the texture of the developed soil is controlled by the parent material. If the parent material has thin strata of contrasting texture, the processes of soil development mix the contrasting strata and soils develop that have more uniform texture than the parent material. The texture of the developed soil, however, remains within the limits of the texture of the parent material.

Water from the Gulf of Mexico covered the valley of the Mississippi River as far north as Cairo, Illinois, during the late Mesozoic and early Cenozoic eras. Except for small areas in Tishomingo County, the entire state of Mississippi was covered by water. Streams emptying into the gulf deposited layers of unconsolidated sand, clay, and silt.

After the water receded from the area that is now Carroll County, marine deposits were exposed. During glaciation, winds deposited several feet of silty material on the marine deposits. This material is commonly called loess. Studies show that the loess is largely glacial rock flour that was carried southward and deposited by the Mississippi River. After the water receded, the dry rock flour was picked up by the wind from the flood plain of the Mississippi River and transported eastward to the top of the east wall of the river valley. This band of loess originally covered the entire upland areas of the county. The deepest loess is in the more rugged areas paralleling the bluffs along the Mississippi Alluvial Plain.

Geologic erosion has removed much of the loess from the stronger slopes. In the eastern part of the county where the loess was originally thinner, only a cap of loess remains on some ridges and Coastal Plains deposits are exposed on steep hillsides. Where the overlying loess is shallow, the upper horizons of the soils have developed from weathered loess and the lower horizons from Coastal Plain material.

In places along the bluffs, some of the original calcareous loess occurs at various depths in the less weathered part of the profile. Unweathered loess has uniform physical and chemical composition. Other distinctive characteristics are fine texture and irregular shape of particles, lack of coherence, and the ability to stand in almost vertical walls.

Loess deposits vary in depth. Loring and Memphis soils formed in loess parent material. Where the loess is thin, the upper horizons of the soil formed in weathered loess and the lower horizons formed in acid marine sediment. Lexington, Providence, and Dulac soils formed in such materials.

The parent materials in the steeper areas of the eastern part of the county are of marine origin and are loamy and clayey. The soil particles are mixtures of sand, silt, and clay and are generally rounded. The

Smithdale soils formed in sandy or loamy marine sediment, and the Maben soils formed in clayey sediment.

The soils on the flood plains formed in alluvium deposited by streams. These soils are dominantly silty, but in some areas, they are mixed with sand and clay. Oaklimeter and Adler soils formed in the dominantly silty alluvium. Arkabutla and Chenneby soils formed in silty material that has a higher percentage of clay. Bruno and Crevasse soils formed in the sandier alluvium. The Alligator and Sharkey soils formed in the clayey slack water sediment of the delta.

Relief

Relief affects soil formation through its influence on soil drainage, erosion, plant cover, and soil temperature. For the most part, elevation in Carroll County ranges from less than 125 feet on the delta to near 500 feet in the eastern part of the county. The maximum relief on the delta is about 50 feet.

The steep slopes on the uplands cause rapid runoff from many soils. Thus, relief influences the amount of moisture in soils and the erosion that occurs on the surface. The amount of water that moves through the soil during formation depends partly upon the relief.

Fragipan formation is associated with relief and drainage. These compact, brittle horizons are most strongly expressed on level to gently sloping topography. Fragipans govern the depth to which roots, air, and water can penetrate in the soil, as well as permeability and wetness of the soil.

The flatness of the flood plains contributes to the slow drainage of some soils because water moves into main channels with difficulty, especially from depressions and level areas. The soils on flood plains are generally grayish and wet. Erosion is very slight in nearly level areas on flood plains.

Relief determines the use and productivity of some soils in Carroll County. More vegetation grows on nearly level soils than on steep soils; therefore, nearly level soils are supplied with more organic matter. Organic matter increases the infiltration, permeability, and water-holding capacity of the soils.

Climate

The humid, warm-temperate climate of Carroll County is characteristic of the southeastern part of the United States. The climate affects the physical, chemical, and biological relationships in soils mainly through precipitation and temperature.

Precipitation and temperature influence the kind and growth of organisms in and on the soil. They also affect the speed of physical and chemical reactions. These reactions are influenced by the warm, moist weather that prevails most of the year. Because precipitation is plentiful in the county, the soils are subject to leaching and erosion.

The internal environment of the soil has been responsible for the present character of many soils in the county. Environmental differences are affected by the presence or absence of a high water table and its depth and duration. Soils that do not have a high water table within the solum are browner or redder and less gray than soils that have a high water table. Memphis, Smithdale, and Lexington soils are well drained and have less gray throughout the solum than the Chenneby and Arkabutla soils, which are somewhat poorly drained and have a seasonal high water table.

Inundated soils are grayish because they have insufficient oxygen and anaerobic decomposition of organic matter has taken place. Acids and other materials from decomposed organic matter reduce the iron and manganese oxides on soil particles. The soils become grayish, and the oxides become more soluble. Since water is not percolating through the soil, the reduced iron is not all removed. Some of the iron is reoxidized, and mottling occurs when the soil dries. Soils that contain no oxidized iron and manganese are grayish. The red, yellow, or brown streaks or spots are coatings of well oxidized iron or manganese on the soil particles. The amount of water that percolates through the soil depends mainly on rainfall, relative humidity, and the length of the frost-free period. Downward percolation is also affected by physiographic position and by soil permeability.

Living Organisms

Plants and animals in and on the soil have helped to change the parent material and have influenced the present character of the soil. Living organisms increase the content of organic matter and nutrients and change the structure and porosity of the soil.

Plants add organic matter and nitrogen to the soil. Some plants can take nitrogen from the atmosphere and, through the decay of the plant residue, add it to the soil. Soil pH is influenced by the plant residue. Products of plant decomposition are an active force in the oxidation-reduction processes, which alter the iron and manganese minerals in the parent material. Bulk density of the soil can be changed rapidly by developing vegetation. The darkening and development of an A horizon by organic matter is one of the earliest indications of horizon development in very young sediment.

Animals in the soil convert raw plant residue into humus and mix the humus with the mineral part of the soil. Animals also carry the humus deep into the soil as they retreat downward along with the moisture during dry weather. Their tunneling moves mineral material from one horizon to another and helps to break down and destroy the original structure of the sediment. Tunnels left by animals also facilitate the movement of air and water through the soil. Earthworms and such large

insects as beetles and grubs are common in most soils. Crustacea, such as crayfish, are in many poorly drained soils.

Microscopic animals aid in decomposition of plant residue and its conversion to humus. Bacteria helps to convert atmospheric nitrogen to available forms in the soil.

Man influences the formation of soils with the development of agriculture and clearing of the native vegetation. By draining swamps, controlling floods, irrigating, introducing new crops, and using lime and other chemicals, man changes the direction of soil formation. The results of these activities on most mineral soils may not be evident for many centuries.

Time

A long time is generally required for the formation of soils that have distinct horizons. The length of time that the parent material has been in place is commonly reflected in the degree to which the soil profile has developed.

The geological age of soils in Carroll County ranges from young to old. The young soils have undergone very little profile development, and the older soils have well defined horizons.

The soils on flood plains are young, and some of them still occasionally receive deposits. Among the youngest soils on the flood plains are the Bruno and Adler soils. In these soils, horizon differentiation is slight. Except for the darkening of the surface layer, these soils have also retained most of the characteristics of their parent material. Chenneby and Dubbs soils are among the older soils on the flood plains. They have weakly defined horizons but also retain many of the characteristics of the parent material.

The soils on uplands are generally much older than the soils on the flood plains. Smithdale and Loring soils are examples of the older soils on uplands. These soils have well defined horizons that bear less resemblance to the original parent material. Through time, however, soil profiles, especially of steep soils, can be altered by geologic erosion.

Geology

Michael C. Seal, geologist, Mississippi Bureau of Geology, prepared this section.

Carroll County is characterized on the surface and in the shallow subsurface by sediments of Eocene, Pliocene, and Pleistocene age. In terms of regional geologic setting, the county is along the eastern portion of the Mississippi Embayment.

The oldest Eocene unit exposed in Carroll County is the Basic City Member of the Tallahatta Formation *(25)*. It is in the lower valley walls in the southeastern and northeastern corners of the county. This unit is characterized by siliceous claystone with interbeds of siliceous siltstone and sandstone. These indurated sediments are also referred to as "buhrstone."

The Winona Formation overlies the Tallahatta Formation. It consists almost entirely of glauconitic and nonglauconitic sands and irregular, knobby, concretionary sandstones. The greensands (glauconitic sands) are light greenish gray to dark green if they are fresh, but weather to a dark brick red. Commonly, the sands are coarse grained and massive to poorly bedded. The formation has thin beds and concretionary masses of siderite (iron carbonate), especially near the top. The Winona Formation crops out in valley walls in the eastern part of the county.

The Zilpha Formation lies above the Winona Formation and is mainly black, grayish white, and chocolate brown carbonaceous clay and shale. The lower part of the formation is nearly pure blocky clay; the upper part is more silty and shaly. Plant fragments are throughout the formation but are more abundant in the upper shaly facies. A few feet of the bottom of this formation are glauconitic and sandy, and glauconite is in small lenses and pockets all the way to the top. Concretions of limonitic siltstone serve as a good marker for the top of the formation. Limonite is hydrous iron oxide. The Zilpha Formation crops out in valley walls in the central and eastern parts of the county.

The Kosciusko Formation lies above the Zilpha Formation. In Carroll County, this formation is almost entirely sand, but in some places, especially in the basal zone, it contains a small amount of clay. The Kosciusko Formation crops out east of the Loess Hills mainly at higher elevations outside of drainage valleys.

The Shipps Creek Shale Member of the Cook Mountain Formation is the youngest Eocene unit exposed in the county. It is a nonmarine facies of the Cook Mountain Formation. The composition is black to chocolate brown to light gray, laminated, and carbonaceous shale and gray to yellow to brown, fine grained, loose sand. The shale contains irregular partings and interbeds of light gray, coarse silt. Flaky, yellow brown, siltstone concretions are along the interbeds. The Shipps Creek Shale is regularly bedded, but individual laminae are extremely irregular and lenticular. Many plant fragments are in the shale; some of the fresh material is very lignitic. Exposures of this formation occur along the wall of the loess bluffs and along the valley walls of streams near the bluffs.

Pre-loess fluvial deposits overlain by loess are above the top of the Eocene units along the bluffs east of the Mississippi River alluvial plain. The pre-loess fluvial deposits are predominantly sand and gravel and are late Pliocene or early Pleistocene in age. The loess, a wind-blown silt, was deposited in the late Pleistocene epoch.

The western part of Carroll County is characterized by the Mississippi River alluvium. On the surface, the Mississippi River alluvial deposits are Holocene in age,

but Pleistocene sediments are probably represented at some depth.

A general geology map of Carroll County is at the back of this publication.

Processes of Horizon Differentiation

Several processes were involved in the formation of soil horizons in the soils of Carroll County. The processes are accumulation of organic matter, leaching of calcium carbonates and bases, reduction and transfer of iron, and formation and translocation of silicate clay minerals. In most soils, more than one of these processes has been active in the development of horizons.

The accumulation of organic matter in the upper part of the soil profile results in the formation of an A horizon. The soils of Carroll County generally are low in content of organic matter.

Carbonates and bases have been leached from nearly all of the soils. Leaching of bases normally precedes translocation of silicate clay minerals. Most of the soils of the county are moderately to strongly leached.

Gleying is the reduction and transfer of iron within the soil. It is evident in the poorly drained soils of the county. The grayish color in the subsoil horizons indicates the reduction and loss of iron. Some horizons contain reddish brown mottles and concretions, which indicates segregation of iron.

The translocation of clay minerals has contributed to the development of soil horizons in the Loring, Memphis, and Providence soils. These soils have an accumulation of translocated silicate clays in the B horizon in the form of clay films. The E horizon, which is above the B horizon, is lower in content of clay and generally is lighter in color. The B horizon generally has an accumulation of clay (clay films) in pores and on ped surfaces. These soils were probably leached of carbonates and soluble salts to a considerable extent before translocation of silicate clays took place. Leaching of bases and translocation of silicate clays are among the more important processes of horizon differentiation in the soils of Carroll County.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well-aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. Soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Broad-base terrace. A ridge-type terrace built to control erosion by diverting runoff along the contour at a nonscouring velocity. The terrace is 10 to 20 inches high and 15 to 30 feet wide and has gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side. It may be nearly level or have a grade toward one or both ends.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels, i.e., clay coating, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in

diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). The volume of soft soil decreases excessively under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazingland for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious

layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic)—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated)—Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess salts (in tables). Excess water-soluble salts in the soil restrict the growth of most plants.

Excess sodium (in tables). Excess exchangeable sodium is in the soil. The resulting poor physical properties restrict the growth of plants.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Forb. Any herbaceous plant that is not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Green-manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the plants that are the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Narrow-base terrace. A terrace no more than 4 to 8 feet wide at the base. A narrow-base terrace is similar to a broad-base terrace, except for the width of the ridge and channel.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch

Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). In these areas, surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). There is a shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). The soil mass is susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally it is indicative of an old weathered surface. In a cross section, thickness of the line can be one fragment or more. It generally overlies material that weathered in place, and it is overlain by recent sediment of variable thickness.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further

divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). An excessive amount of toxic substances in the soil, such as sodium or sulfur, severely hinders the establishment of vegetation or severely restricts plant growth.

Trace elements. Chemical elements, such as zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). There is a risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. This contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data recorded in the period 1951-81 at Greenwood, Mississippi]

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	52.2	34.5	43.4	76	12	78	5.04	2.43	7.29	7	0.9
February---	56.9	37.2	47.1	79	16	93	4.51	2.71	6.12	7	0.5
March------	64.8	44.4	54.6	84	25	213	6.17	3.37	8.62	8	0.2
April------	75.3	53.6	64.5	89	35	435	5.40	2.99	7.52	7	0.0
May--------	82.8	61.7	72.3	95	45	691	4.95	2.22	7.27	7	0.0
June-------	89.9	68.9	79.4	101	54	882	3.44	1.07	5.36	5	0.0
July-------	92.2	71.8	82.0	101	61	992	4.53	2.13	6.58	6	0.0
August-----	91.3	70.3	80.8	100	58	955	2.75	1.07	4.15	5	0.0
September--	86.1	64.4	75.3	98	45	759	3.27	0.89	5.17	5	0.0
October----	76.4	51.7	64.1	92	32	443	2.84	1.05	4.37	4	0.0
November---	64.2	42.5	53.4	84	21	158	4.47	1.95	6.60	6	0.0
December---	55.5	36.8	46.2	78	15	76	5.29	2.54	7.67	7	0.2
Yearly:											
Average--	74.0	53.2	63.3	---	---	---	---	---	---	---	---
Extreme--	---	---	---	102	10	---	---	---	---	---	---
Total----	---	---	---	---	---	5,775	52.66	43.31	61.56	74	1.8

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 °F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data recorded in the period 1951-81 at Greenwood, Mississippi]

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 12	March 23	March 30
2 years in 10 later than--	February 28	March 14	March 25
5 years in 10 later than--	February 6	February 25	March 17
First freezing temperature in fall:			
1 year in 10 earlier than--	November 10	October 31	October 23
2 years in 10 earlier than--	November 18	November 8	October 28
5 years in 10 earlier than--	December 4	November 23	November 8

TABLE 3.--GROWING SEASON

[Data recorded in the period 1951-81 at Greenwood, Mississippi]

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	263	237	218
8 years in 10	276	249	224
5 years in 10	300	270	235
2 years in 10	324	291	246
1 year in 10	337	302	252

TABLE 4.--COMPOSITION OF MULTI-TAXA MAP UNITS

[The data are based on 80 percent probability that the named soils occur in each delineation within the ranges listed]

Map symbol and soil name	Range		Average
	Lower	Upper	
7F:			
Memphis	46	58	52
Natchez	27	37	32
9F:			
Smithdale	31	44	37
Providence	22	32	27
Lexington	14	20	17
14E:			
Maben	33	77	55
Memphis	8	32	20
17:			
Chenneby	48	62	55
Arkabutla	29	43	36
19:			
Bruno	57	71	64
Tutwiler	22	34	28
34E:			
Loring	38	50	44
Memphis	37	47	42
46:			
Gullied land	53	62	57
Loring	22	33	27
48:			
Gullied land	44	56	50
Smithdale	20	32	26
61F1:			
Natchez	47	63	55
Saffell	33	49	41

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1A	Calloway silt loam, 0 to 1 percent slopes	2,560	0.6
2A	Dubbs silt loam, 0 to 2 percent slopes	2,710	0.7
3A	Dundee silt loam, 0 to 2 percent slopes	2,790	0.7
3C3	Dulac silt loam, 5 to 8 percent slopes, severely eroded	760	0.2
3D3	Dulac silt loam, 8 to 12 percent slopes, severely eroded	1,830	0.4
4A	Grenada silt loam, 0 to 1 percent slopes	1,720	0.4
4B	Grenada silt loam, 1 to 3 percent slopes	3,750	0.9
5B2	Loring silt loam, 2 to 5 percent slopes, eroded	6,442	1.6
5C2	Loring silt loam, 5 to 8 percent slopes, eroded	14,100	3.5
5C3	Loring silt loam, 5 to 8 percent slopes, severely eroded	9,810	2.4
5D3	Loring silt loam, 8 to 12 percent slopes, severely eroded	10,040	2.5
6A	Memphis silt loam, 0 to 2 percent slopes	3,010	0.7
6B2	Memphis silt loam, 2 to 5 percent slopes, eroded	2,720	0.7
6C2	Memphis silt loam, 5 to 8 percent slopes, eroded	5,290	1.3
6C3	Memphis silt loam, 5 to 8 percent slopes, severely eroded	5,270	1.3
6D3	Memphis silt loam, 8 to 12 percent slopes, severely eroded	7,610	1.9
6E3	Memphis silt loam, 12 to 40 percent slopes, severely eroded	26,050	6.4
6F2	Memphis silt loam, 15 to 40 percent slopes, eroded	5,080	1.2
7F	Memphis-Natchez association, hilly	27,900	6.8
8C3	Providence silt loam, 5 to 8 percent slopes, severely eroded	8,310	2.0
8D3	Providence silt loam, 8 to 12 percent slopes, severely eroded	18,450	4.5
9F	Smithdale-Providence-Lexington association, hilly	81,900	20.1
10E2	Smithdale sandy loam, 12 to 30 percent slopes, eroded	15,050	3.7
13	Bruno sandy loam, occasionally flooded	9,780	2.4
14E	Maben-Memphis complex, 8 to 20 percent slopes	2,000	0.5
17	Chenneby-Arkabutla association, frequently flooded	5,300	1.3
19	Bruno-Tutwiler complex	2,410	0.6
20	Alligator silty clay	770	0.2
21	Adler silt loam, occasionally flooded	10,560	2.6
22	Arkabutla silt loam, frequently flooded	1,960	0.5
23	Chenneby silt loam, frequently flooded	2,150	0.5
24	Forestdale silt loam	1,520	0.4
25	Morganfield silt loam, occasionally flooded	2,080	0.5
26	Oaklimeter silt loam, occasionally flooded	21,980	5.4
27	Sharkey clay, frequently flooded	2,340	0.6
28	Ariel silt, occasionally flooded	6,770	1.7
34E	Loring-Memphis association, rolling	10,230	2.5
43	Falaya silt, occasionally flooded	3,950	1.0
46	Gullied land-Loring complex	19,718	4.8
48	Gullied land-Smithdale complex	5,850	1.4
50	Udorthents, gravelly	3,240	0.8
60F1	Natchez-Saffell association, hilly	3,410	0.8
72	Crevasse sand, occasionally flooded	1,920	0.5
80	Bonn silt loam, occasionally flooded	1,890	0.5
210	Adler silt loam	12,220	3.0
250	Morganfield silt loam	1,190	0.3
300	Sharkey clay, ponded	6,000	1.5
	Water (less than 40 acres)	2,630	0.6
	Water (more than 40 acres)	3,300	0.8
	Total	408,320	100.0

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Land capability	Soybeans	Corn	Wheat	Common bermudagrass	Improved bermudagrass	Tall fescue	Cotton lint
		Bu	Bu	Bu	AUM*	AUM*	AUM*	Lbs
1A---------- Calloway	IIw	35	85	35	6.0	9.0	8.0	650
2A---------- Dubbs	I	40	90	50	8.0	12.0	10.0	850
3A---------- Dundee	IIw	40	85	45	7.0	9.0	9.0	750
3C3---------- Dulac	IVe	20	60	32	6.0	8.5	7.0	500
3D3---------- Dulac	VIe	---	---	---	5.0	7.0	5.5	---
4A---------- Grenada	IIw	40	95	40	7.0	9.5	8.0	750
4B---------- Grenada	IIe	35	80	35	7.0	9.5	7.5	650
5B2---------- Loring	IIe	35	90	40	7.0	9.5	8.0	700
5C2---------- Loring	IIIe	30	80	35	5.5	8.5	7.5	600
5C3---------- Loring	IVe	20	65	32	5.0	8.5	7.0	500
5D3---------- Loring	VIe	---	---	---	4.5	7.0	5.5	---
6A---------- Memphis	I	45	105	45	8.0	10.5	8.5	850
6B2---------- Memphis	IIe	35	90	35	7.5	10.0	8.5	800
6C2---------- Memphis	IIIe	30	80	30	7.0	9.0	7.5	750
6C3---------- Memphis	IIIe	20	60	20	5.5	6.5	6.5	550
6D3---------- Memphis	VIe	---	---	---	5.5	6.5	6.5	---
6E3---------- Memphis	VIIe	---	---	---	4.5	6.0	---	---
6F2---------- Memphis	VIe	---	---	---	5.0	6.5	---	---

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Soybeans	Corn	Wheat	Common bermudagrass	Improved bermudagrass	Tall fescue	Cotton lint
		Bu	Bu	Bu	AUM*	AUM*	AUM*	Lbs
7F:								
Memphis	VIe	---	---	---	4.5	6.5	5.0	---
Natchez	VIe	---	---	---	4.5	6.5	5.0	---
8C3---------- Providence	IVe	20	45	---	6.5	8.5	6.5	400
8D3---------- Providence	VIe	---	---	---	5.5	7.5	5.0	---
9F:								
Smithdale	VIIe	---	---	---	---	---	---	---
Providence	VIe	---	---	---	---	---	---	---
Lexington	VIe	---	---	---	---	---	---	---
10E2---------- Smithdale	VIIe	---	---	---	---	---	---	---
13---------- Bruno	IIIs	25	40	30	4.0	4.5	4.5	300
14E:								
Maben	VIe	---	---	---	4.5	5.5	5.0	---
Memphis	VIe	---	---	---	5.0	6.5	5.0	---
17:								
Chenneby	IVw	---	---	---	6.0	9.0	9.0	---
Arkabutla	IVw	---	---	---	6.0	9.0	9.0	---
19:								
Bruno	IIIs	25	40	30	4.0	4.5	4.5	300
Tutwiler	IIe	35	85	35	8.5	9.5	9.5	800
20---------- Alligator	IIIw	35	---	45	7.5	9.0	9.0	600
21---------- Adler	IIw	35	100	50	7.0	12.0	9.5	800
22---------- Arkabutla	IVw	---	---	---	6.0	9.0	9.0	---
23---------- Chenneby	IVw	---	---	---	6.0	9.0	9.0	---
24---------- Forestdale	IIIw	35	50	40	6.5	9.0	9.0	600
25---------- Morganfield	IIw	45	115	50	8.0	12.0	10.0	950
26---------- Oaklimeter	IIw	40	95	40	9.0	11.0	10.0	750

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Soybeans	Corn	Wheat	Common bermudagrass	Improved bermudagrass	Tall fescue	Cotton lint
		Bu	Bu	Bu	AUM*	AUM*	AUM*	Lbs
27--- Sharkey	Vw	---	---	---	3.0	4.5	4.5	---
28--- Ariel	IIw	40	110	40	6.0	11.0	10.0	800
34E:								
Loring---	VIe	---	---	---	4.5	8.0	5.0	---
Memphis---	VIe	---	---	---	5.0	6.5	5.0	---
43--- Falaya	IIw	40	100	35	7.0	10.0	9.0	750
46:								
Gullied land.								
Loring---	VIIe	---	---	---	---	---	---	---
48:								
Gullied land.								
Smithdale---	VIIe	---	---	---	---	---	---	---
50. Udorthents	---	---	---	---	---	---	---	---
60F1:								
Natchez---	VIe	---	---	---	---	---	---	---
Saffell---	VIIe	---	---	---	---	---	---	---
72--- Crevasse	IVs	---	---	---	---	---	---	---
80--- Bonn	IVs	15	20	---	4.0	6.0	---	300
210--- Adler	I	35	110	50	9.0	12.0	9.5	800
250--- Morganfield	I	45	125	50	9.0	12.0	10.0	1,000
300--- Sharkey	Vw	---	---	---	4.2	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	19,130	---	---	---	---
II	66,045	13,635	52,410	---	---
III	38,417	24,660	2,290	11,467	---
IV	32,100	18,880	9,410	3,810	---
V	8,340	---	8,340	---	---
VI	129,310	129,310	---	---	---
VII	88,539	88,539	---	---	---
VIII	---	---	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Gullied land, which is a miscellaneous area, is listed but is not suitable for production of commercial trees. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity class*	
1A---------- Calloway	8W	Slight	Moderate	Slight	Moderate	Loblolly pine-------	80	8	Sweetgum, loblolly pine.
						Cherrybark oak------	80	8	
						Shortleaf pine------	70	8	
						Sweetgum------------	80	6	
						Water oak-----------	80	5	
2A---------- Dubbs	10A	Slight	Slight	Slight	Slight	Cherrybark oak------	100	10	Eastern cottonwood, green ash, Nuttall oak, sweetgum, American sycamore, yellow poplar.
						Eastern cottonwood--	100	9	
						Green ash-----------	80	4	
						Nuttall oak---------	95	---	
						Shumard oak---------	100	5	
						Sweetgum------------	95	8	
						Water oak-----------	90	6	
						Willow oak----------	95	6	
3A---------- Dundee	12W	Slight	Moderate	Slight	Moderate	Cherrybark oak------	105	12	Cherrybark oak, eastern cottonwood, sweetgum, water oak, yellow poplar.
						Eastern cottonwood--	100	9	
						Sweetgum------------	100	10	
						Water oak-----------	95	6	
3C3, 3D3-------- Dulac	8A	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	80	8	Loblolly pine.
						Shortleaf pine------	75	8	
						Sweetgum------------	80	6	
4A, 4B---------- Grenada	8A	Slight	Slight	Slight	Moderate	Loblolly pine-------	85	8	Water oak, Shumard oak, cherrybark oak, loblolly pine, white oak, sweetgum.
						Southern red oak----	80	4	
						Cherrybark oak------	85	7	
						Shortleaf pine------	75	8	
						Sweetgum------------	80	6	
5B2, 5C2, 5C3, 5D3---------- Loring	9A	Slight	Slight	Slight	Moderate	Loblolly pine-------	87	9	Yellow poplar, cherrybark oak, loblolly pine.
						Southern red oak----	74	4	
						Cherrybark oak------	86	7	
						Sweetgum------------	90	7	
						Water oak-----------	82	5	
6A, 6B2, 6C2, 6C3, 6D3------- Memphis	9A	Slight	Slight	Slight	Slight	Loblolly pine-------	90	9	Cherrybark oak, loblolly pine, yellow poplar.
						Cherrybark oak------	90	8	
						Sweetgum------------	90	7	
6E3, 6F2-------- Memphis	9R	Severe	Moderate	Slight	Slight	Loblolly pine-------	90	9	Loblolly pine, cherrybark oak, yellow poplar.
						Cherrybark oak------	90	8	
						Sweetgum------------	90	7	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity class*	
7F:									
Memphis	9R	Severe	Moderate	Slight	Slight	Loblolly pine	90	9	Loblolly pine, cherrybark oak, yellow poplar.
						Cherrybark oak	90	8	
						Sweetgum	90	7	
Natchez	10R	Moderate	Moderate	Slight	Slight	Eastern cottonwood	105	10	Eastern cottonwood, loblolly pine, sweetgum, American sycamore, yellow poplar. cherrybark oak.
						Loblolly pine	90	9	
						Sweetgum	105	11	
8C3, 8D3 Providence	8W	Moderate	Slight	Slight	Moderate	Loblolly pine	84	8	Loblolly pine, Shumard oak, sweetgum, yellow poplar.
						Shortleaf pine	64	7	
						Sweetgum	90	7	
9F:									
Smithdale	8R	Moderate	Moderate	Slight	Slight	Loblolly pine	80	8	Loblolly pine.
						Shortleaf pine	69	8	
Providence	8W	Moderate	Slight	Slight	Moderate	Loblolly pine	84	8	Loblolly pine, Shumard oak, sweetgum, yellow poplar.
						Shortleaf pine	64	7	
						Sweetgum	90	7	
Lexington	9A	Severe	Moderate	Slight	Moderate	Loblolly pine	90	9	Cherrybark oak, yellow poplar, sweetgum, loblolly pine, shortleaf pine, southern red oak.
						Southern red oak	70	4	
						Cherrybark oak	80	6	
						Shortleaf pine	70	8	
						Sweetgum	89	7	
						Yellow poplar	90	6	
10E2 Smithdale	8R	Moderate	Moderate	Slight	Slight	Loblolly pine	80	8	Loblolly pine.
						Shortleaf pine	69	8	
13 Bruno	9S	Slight	Slight	Moderate	Moderate	Cherrybark oak	94	9	Cherrybark oak, Shumard oak, willow oak, sweetgum, yellow poplar, loblolly pine.
						Water oak	90	6	
						Sweetgum	94	8	
						Willow oak	90	6	
						River birch	---	---	
						Yellow poplar	94	7	
						Loblolly pine	93	10	
						American sycamore	100	9	
						Eastern cottonwood	110	11	
						Black willow	---	---	
14E:									
Maben	8C	Slight	Moderate	Slight	Slight	Loblolly pine	83	8	Loblolly pine.
						Shortleaf pine	73	8	
Memphis	9A	Slight	Slight	Slight	Slight	Loblolly pine	90	9	Cherrybark oak, loblolly pine, yellow poplar.
						Cherrybark oak	90	8	
						Sweetgum	90	7	

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity class*	
17:									
Chenneby	9W	Slight	Moderate	Moderate	Severe	Loblolly pine	100	9	Loblolly pine, yellow poplar, sweetgum, water oak, American sycamore.
						Sweetgum	100	10	
						Water oak	100	7	
						Yellow poplar	110	9	
						American sycamore	110	11	
Arkabutla	12W	Slight	Severe	Moderate	Moderate	Cherrybark oak	105	12	Cherrybark oak, eastern cottonwood, green ash, loblolly pine, sweetgum, American sycamore.
						Eastern cottonwood	110	---	
						Green ash	95	4	
						Loblolly pine	100	9	
						Nuttall oak	110	---	
						Sweetgum	100	10	
						Water oak	100	---	
19:									
Bruno	9S	Slight	Slight	Moderate	Moderate	Cherrybark oak	94	9	Cherrybark oak, Shumard oak, willow oak, sweetgum, yellow poplar, loblolly pine.
						Water oak	90	6	
						Sweetgum	94	8	
						Willow oak	90	6	
						River birch	---	---	
						Yellow poplar	94	7	
						Loblolly pine	93	10	
						American sycamore	100	9	
						Eastern cottonwood	110	11	
						Black willow	---	---	
Tutwiler	9A	Slight	Moderate	Slight	Slight	Cherrybark oak	95	9	Cherrybark oak, eastern cottonwood, sweetgum, American sycamore, water oak.
						Eastern cottonwood	100	9	
						Sweetgum	100	10	
						Water oak	90	6	
20--Alligator	8W	Slight	Severe	Moderate	Moderate	Eastern cottonwood	95	8	Eastern cottonwood, green ash, sweetgum, American sycamore.
						Green ash	80	---	
						Water oak	90	6	
						Sweetgum	90	7	
21--Adler	13A	Slight	Moderate	Moderate	Moderate	Eastern cottonwood	120	13	Eastern cottonwood, green ash, sweetgum, American sycamore.
						Green ash	95	---	
						Water oak	100	7	
						Willow oak	100	7	
						Sweetgum	100	10	
						American sycamore	115	13	
22--Arkabutla	12W	Slight	Severe	Moderate	Moderate	Cherrybark oak	105	12	Cherrybark oak, eastern cottonwood, green ash, loblolly pine, sweetgum, American sycamore.
						Eastern cottonwood	110	---	
						Green ash	95	---	
						Loblolly pine	100	9	
						Nuttall oak	110	---	
						Sweetgum	100	10	
						Water oak	100	---	

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity class*	
23--Chenneby	9W	Slight	Moderate	Moderate	Severe	Loblolly pine	100	9	Loblolly pine, yellow poplar, sweetgum, water oak, American sycamore.
						Sweetgum	100	10	
						Water oak	100	7	
						Yellow poplar	110	9	
						American sycamore	110	11	
24--Forestdale	9W	Slight	Moderate	Moderate	Severe	Eastern cottonwood	100	9	Eastern cottonwood, green ash, Nuttall oak, sweetgum, American sycamore.
						Green ash	78	---	
						Cherrybark oak	94	9	
						Nuttall oak	99	---	
						Water oak	90	6	
						Willow oak	94	6	
						Sweetgum	100	10	
25--Morganfield	13A	Slight	Slight	Slight	Moderate	Eastern cottonwood	120	13	Eastern cottonwood, green ash, sweetgum, American sycamore, yellow poplar.
						Green ash	90	---	
						Nuttall oak	100	---	
						Sweetgum	110	12	
						Water oak	105	7	
						Yellow poplar	115	9	
26--Oaklimeter	10A	Slight	Slight	Moderate	Moderate	Cherrybark oak	100	10	Cherrybark oak, eastern cottonwood, loblolly pine, Nuttall oak, sweetgum, water oak, yellow poplar.
						Eastern cottonwood	100	9	
						Green ash	90	---	
						Loblolly pine	90	9	
						Nuttall oak	100	---	
						Willow oak	100	7	
						Sweetgum	100	10	
27--Sharkey	6W	Slight	Severe	Severe	Severe	Water hickory	---	6	Baldcypress.
						Overcup oak	---	---	
						Baldcypress	---	---	
						Black willow	---	---	
28--Ariel	10A	Slight	Slight	Slight	Moderate	Loblolly pine	95	10	Loblolly pine, cherrybark oak, eastern cottonwood, sweetgum, water oak, yellow poplar.
						Cherrybark oak	110	13	
						Eastern cottonwood	115	12	
						Sweetgum	100	10	
						Water oak	105	7	
						Yellow poplar	110	9	
34E:									
Loring	9A	Severe	Moderate	Slight	Moderate	Loblolly pine	87	9	Yellow poplar, cherrybark oak, southern red oak, loblolly pine.
						Southern red oak	74	4	
						Cherrybark oak	86	7	
						Sweetgum	90	7	
						Water oak	82	5	
Memphis	9A	Slight	Slight	Slight	Slight	Loblolly pine	90	9	Cherrybark oak, loblolly pine, yellow poplar.
						Cherrybark oak	90	8	
						Sweetgum	90	7	

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity class*	
43--------- Falaya	11W	Slight	Moderate	Moderate	Moderate	Cherrybark oak------	102	11	Eastern cottonwood, green ash, cherrybark oak, sweetgum yellow poplar.
						Eastern cottonwood--	100	9	
						Nuttall oak---------	109	7	
						Water oak----------	102	7	
						Loblolly pine-------	104	9	
						Green ash----------	92	9	
46: Gullied land.									
Loring---------	9A	Moderate	Moderate	Slight	Moderate	Loblolly pine-------	87	9	Yellow poplar, cherrybark oak, southern red oak, loblolly pine, shortleaf pine.
						Southern red oak----	74	4	
						Cherrybark oak------	86	7	
						Sweetgum-----------	90	7	
						Water oak----------	82	5	
48: Gullied land.									
Smithdale------	8R	Moderate	Moderate	Slight	Slight	Loblolly pine-------	80	8	Loblolly pine.
						Shortleaf pine------	69	8	
60F1: Natchez--------	9R	Moderate	Moderate	Slight	Slight	Loblolly pine-------	90	9	Eastern cottonwood, green ash, loblolly pine, sweetgum, American sycamore, yellow poplar.
						Eastern cottonwood--	105	10	
						Sweetgum-----------	105	11	
Saffell--------	7R	Severe	Severe	Severe	Slight	Loblolly pine-------	75	7	Loblolly pine.
						Shortleaf pine------	65	7	
						White oak----------	---	---	
						Chestnut oak--------	---	---	
72--------- Crevasse	7S	Slight	Slight	Moderate	Slight	Sweetgum-----------	90	7	
						White oak----------	100	5	
210--------- Adler	13A	Slight	Moderate	Moderate	Moderate	Eastern cottonwood--	120	13	Eastern cottonwood, green ash, sweetgum, American sycamore.
						Green ash----------	95	---	
						Water oak----------	100	7	
						Willow oak---------	100	7	
						Sweetgum-----------	100	10	
						American sycamore---	115	13	
250--------- Morganfield	13A	Slight	Slight	Slight	Moderate	Eastern cottonwood--	120	13	Eastern cottonwood, green ash, sweetgum, American sycamore, yellow poplar.
						Green ash----------	90	4	
						Nuttall oak---------	100	---	
						Sweetgum-----------	110	12	
						Water oak----------	105	7	
						Yellow poplar-------	115	9	

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity class*	
300---------- Sharkey	6W	Slight	Severe	Severe	Severe	Baldcypress---------	100	6	Baldcypress.
						Water hickory-------	---	---	
						Overcup oak---------	---	---	
						Black willow--------	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 9.--WOODLAND UNDERSTORY VEGETATION

[Only the soils suitable for production of commercial trees are listed. Gullied land, which is a miscellaneous area, is listed but is not suitable for production of commercial trees. Absence of an entry indicates the information is not available]

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
1A---------- Calloway	Favorable	---	Pinehill bluestem----------	20
	Normal	1,800	Switchcane----------	25
	Unfavorable	---	Longleaf uniola----------	15
2A---------- Dubbs	Favorable	---		
	Normal	---		
	Unfavorable	---		
3A---------- Dundee	Favorable	---		
	Normal	---		
	Unfavorable	---		
3C3, 3D3---------- Dulac	Favorable	---		
	Normal	---		
	Unfavorable	---		
4A, 4B---------- Grenada	Favorable	---	Beaked panicum----------	30
	Normal	1,900	Longleaf uniola----------	15
	Unfavorable	---	Pinehill bluestem----------	25
			Switchcane----------	10
5B2, 5C2, 5C3, 5D3- Loring	Favorable	---	Beaked panicum----------	30
	Normal	1,900	Pinehill bluestem----------	25
	Unfavorable	---	Longleaf uniola----------	15
			Switchcane----------	10
6A, 6B2, 6C2, 6C3, 6D3, 6E3, 6F2----- Memphis	Favorable	---	Beaked panicum----------	30
	Normal	1,900	Longleaf uniola----------	20
	Unfavorable	---	Switchcane----------	15
			Pinehill bluestem----------	25
7F: Memphis----------	Favorable	---	Beaked panicum----------	30
	Normal	1,900	Longleaf uniola----------	20
	Unfavorable	---	Switchcane----------	15
			Pinehill bluestem----------	25
Natchez----------	Favorable	---	Beaked panicum----------	30
	Normal	1,900	Longleaf uniola----------	20
	Unfavorable	---	Pinehill bluestem----------	25
			Switchcane----------	15
			Panicum----------	10
8C3, 8D3---------- Providence	Favorable	---	Beaked panicum----------	30
	Normal	1,900	Pinehill bluestem----------	25
	Unfavorable	---	Longleaf uniola----------	15
			Switchcane----------	10

TABLE 9.--WOODLAND UNDERSTORY VEGETATION--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
9F:				
Smithdale	Favorable	---	Longleaf uniola	40
	Normal	1,000	Pinehill bluestem	20
	Unfavorable	---	Beaked panicum	20
			Panicum	12
Providence	Favorable	---	Beaked panicum	30
	Normal	1,900	Pinehill bluestem	25
	Unfavorable	---	Longleaf uniola	15
			Switchcane	10
Lexington	Favorable	---	Beaked panicum	30
	Normal	1,900	Pinehill bluestem	25
	Unfavorable	---	Longleaf uniola	15
			Switchcane	10
10E2	Favorable	---	Longleaf uniola	40
Smithdale	Normal	1,200	Pinehill bluestem	20
	Unfavorable	---	Beaked panicum	20
			Panicum	12
13	Favorable	---	Longleaf uniola	40
Bruno	Normal	1,600	Beaked panicum	25
	Unfavorable	---	Pinehill bluestem	15
14E:				
Maben	Favorable	---	Pinehill bluestem	25
	Normal	1,200	Cutover muhly	17
	Unfavorable	---	Longleaf uniola	17
			Beaked panicum	9
Memphis	Favorable	---	Beaked panicum	25
	Normal	1,900	Longleaf uniola	15
	Unfavorable	---	Switchcane	15
			Little bluestem	10
			Pinehill bluestem	10
17:				
Chenneby	Favorable	---		
	Normal	---		
	Unfavorable	---		
Arkabutla	Favorable	---	Pinehill bluestem	33
	Normal	1,200	Switchcane	26
	Unfavorable	---	Longleaf uniola	20
19:				
Bruno	Favorable	---	Longleaf uniola	40
	Normal	1,600	Beaked panicum	25
	Unfavorable	---	Pinehill bluestem	15
Tutwiler	Favorable	---		
	Normal	---		
	Unfavorable	---		
20	Favorable	---		
Alligator	Normal	---		
	Unfavorable	---		

TABLE 9.--WOODLAND UNDERSTORY VEGETATION--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
21---------- Adler	Favorable	1,500	Pineland bluestem----------	30
	Normal	---	Switchcane----------	27
	Unfavorable	---	Longleaf uniola----------	20
			Switchgrass----------	8
			Beaked panicum----------	8
22---------- Arkabutla	Favorable	---	Pinehill bluestem----------	33
	Normal	1,500	Switchcane----------	26
	Unfavorable	---	Longleaf uniola----------	20
23---------- Chenneby	Favorable	---		
	Normal	---		
	Unfavorable	---		
24---------- Forestdale	Favorable	---		
	Normal	---		
	Unfavorable	---		
25---------- Morganfield	Favorable	---		
	Normal	---		
	Unfavorable	---		
26---------- Oaklimeter	Favorable	---	Beaked panicum----------	30
	Normal	1,600	Pinehill bluestem----------	25
	Unfavorable	---	Switchcane----------	20
			Longleaf uniola----------	16
27---------- Sharkey	Favorable	---		
	Normal	---		
	Unfavorable	---		
28---------- Ariel	Favorable	---	Beaked panicum----------	30
	Normal	1,600	Pinehill bluestem----------	25
	Unfavorable	---	Switchcane----------	20
			Longleaf uniola----------	16
34E:				
Loring----------	Favorable	---	Beaked panicum----------	30
	Normal	1,900	Pinehill bluestem----------	25
	Unfavorable	---	Longleaf uniola----------	15
			Switchcane----------	10
Memphis----------	Favorable	---	Beaked panicum----------	30
	Normal	1,900	Longleaf uniola----------	20
	Unfavorable	---	Switchcane----------	15
			Pinehill bluestem----------	25
43---------- Falaya	Favorable	---	Pinehill bluestem----------	33
	Normal	1,500	Switchcane----------	26
	Unfavorable	---	Longleaf uniola----------	20
			Beaked panicum----------	5
46: Gullied land.				
Loring----------	Favorable	---	Beaked panicum----------	30
	Normal	1,900	Pinehill bluestem----------	25
	Unfavorable	---	Longleaf uniola----------	15
			Switchcane----------	10

TABLE 9.--WOODLAND UNDERSTORY VEGETATION--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
48: Gullied land.				
Smithdale	Favorable	---	Longleaf uniola	40
	Normal	1,000	Pinehill bluestem	20
	Unfavorable	---	Beaked panicum	20
			Panicum	12
60F1: Natchez	Favorable	---	Beaked panicum	30
	Normal	1,900	Longleaf uniola	20
	Unfavorable	---	Pinehill bluestem	25
			Switchcane	15
			Panicum	10
Saffell	Favorable	---	Pinehill bluestem	30
	Normal	1,000	Uniola	15
	Unfavorable	---	Beaked panicum	10
			Indiangrass	15
			Panicum	15
			Threeawn	10
72 Crevasse	Favorable	---	Little bluestem	50
	Normal	2,000	Indiangrass	10
	Unfavorable	---	Brownseed paspalum	5
80 Bonn	Favorable	---		
	Normal	---		
	Unfavorable	---		
210 Adler	Favorable	1,500	Pinehill bluestem	30
	Normal	---	Switchcane	27
	Unfavorable	---	Longleaf uniola	20
			Switchgrass	8
			Beaked panicum	8
250 Morganfield	Favorable	---		
	Normal	---		
	Unfavorable	---		
300 Sharkey	Favorable	---		
	Normal	---		
	Unfavorable	---		

TABLE 10.--ENVIRONMENTAL PLANTINGS

[Key to Chart: 1=Well suited; 2=Suited; 3=Poorly suited. Absence of an entry indicates the species does not grow well on the soil]

Map symbol and soil name	Trees (Expected height of 20 years)													Ornamental shrubs							
	Loblolly pine	Southern red oak	Water oak	Willow oak	Yellow poplar	Black cherry	Pecan	Red apple	Red mulberry	Southern magnolia	American holly	Flowering dogwood	Common sassafras	Azaleas	Crapemyrtle	Holly	Nandina	Pyracantha	Redbud	Rhododendron	Rose
	----More than 50 feet----					-------30 to 50 feet-------					--15 to 30 feet--										
1A---------- Calloway	1	3	1	1	3	3	3	3	2	2	2	2	3	2	2	3	2	2	2	2	3
2A---------- Dubbs	2	2	2	1	1	2	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1
3A---------- Dundee	3	3	1	1	2	2	1	1	2	2	2	2	2	1	1	1	1	1	1	1	1
3C3, 3D3----- Dulac	2	2	2	2	3	2	3	3	3	3	2	2	2	1	1	1	1	1	1	1	1
4A, 4B------- Grenada	1	2	2	2	3	2	2	2	2	3	2	2	2	1	1	2	1	1	1	1	2
5B2, 5C2, 5C3, 5D3---- Loring	2	2	2	2	3	2	2	2	2	3	2	2	1	1	1	1	1	1	1	1	1
6A, 6B2, 6C2, 6C3, 6D3, 6E3, 6F2---- Memphis	2	2	2	2	2	2	2	2	2	3	2	2	1	1	1	1	1	1	1	1	1
7F:																					
Memphis-----	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1
Natchez-----	3	2	2	2	2	2	2	2	2	2	2	2	1	3	1	1	1	1	1	1	1
8C3, 8D3----- Providence	2	2	2	2	2	2	3	3	3	3	2	2	2	1	1	1	1	1	1	1	1
9F:																					
Smithdale---	2	2	3	3	3	3	3	3	2	3	2	2	1	1	1	1	1	1	1	1	2
Providence--	2	2	2	2	2	2	3	3	3	3	2	2	2	1	1	1	1	1	1	1	1
Lexington---	2	2	2	2	2	2	2	2	2	3	2	2	1	1	1	1	1	1	1	1	1

TABLE 10.--ENVIRONMENTAL PLANTINGS--Continued

Map symbol and soil name	Trees (Expected height of 20 years)													Ornamental shrubs							
	Loblolly pine	Southern red oak	Water oak	Willow oak	Yellow poplar	Black cherry	Pecan	Red apple	Red mulberry	Southern magnolia	American holly	Flowering dogwood	Common sassafras	Azaleas	Crapemyrtle	Holly	Nandina	Pyracantha	Redbud	Rhododendron	Rose
	----More than 50 feet----					-------30 to 50 feet-------					--15 to 30 feet--										
10E2--------- Smithdale	2	2	3	3	3	3	3	3	2	3	2	2	1	1	1	1	1	1	1	1	2
13---------- Bruno	3	2	1	1	1	3	2	3	2	3	2	2	1	---	---	---	---	---	---	---	---
14E: Maben--------	2	2	3	3	3	2	2	1	2	2	2	2	3	1	2	1	1	1	1	1	3
Memphis-----	3	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1
17: Chenneby----	1	3	1	1	1	2	1	1	2	1	1	1	2	---	---	---	---	---	---	---	---
Arkabutla---	1	2	1	1	2	2	2	1	3	1	3	3	3	---	---	---	---	---	---	---	---
19: Bruno--------	3	2	1	1	1	3	2	3	2	3	2	2	1	---	---	---	---	---	---	---	---
Tutwiler----	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
20---------- Alligator	3	3	1	1	3	3	3	1	2	2	3	3	3	3	3	3	3	2	2	3	3
21---------- Adler	2	1	1	1	1	1	1	1	1	2	2	2	1	3	1	1	1	1	1	3	1
22---------- Arkabutla	1	2	1	1	2	2	2	1	3	1	3	3	3	---	---	---	---	---	---	---	---
23---------- Chenneby	1	3	1	1	1	2	1	1	2	1	1	1	2	---	---	---	---	---	---	---	---
24---------- Forestdale	3	3	1	1	3	2	2	1	2	2	2	3	3	3	3	3	3	2	2	3	3
25---------- Morganfield	2	1	1	1	1	1	1	1	1	2	2	2	1	3	1	1	1	1	1	3	1
26---------- Oaklimeter	1	1	1	1	1	1	1	1	1	1	1	1	2	2	1	1	2	2	2	1	1

TABLE 10.--ENVIRONMENTAL PLANTINGS--Continued

Map symbol and soil name	Trees (Expected height of 20 years)													Ornamental shrubs							
	Loblolly pine	Southern red oak	Water oak	Willow oak	Yellow poplar	Black cherry	Pecan	Red apple	Red mulberry	Southern magnolia	American holly	Flowering dogwood	Common sassafras	Azaleas	Crapemyrtle	Holly	Nandina	Pyracantha	Redbud	Rhododendron	Rose
	----More than 50 feet----					-------30 to 50 feet-------					--15 to 30 feet--										
27---------- Sharkey	3	3	1	1	3	3	3	1	2	2	3	3	3	---	---	---	---	---	---	---	---
28---------- Ariel	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1	1
34E:																					
Loring------	2	2	2	2	3	2	2	2	2	3	2	2	1	1	1	1	1	1	1	1	1
Memphis-----	2	2	2	2	2	2	2	2	2	3	2	2	1	1	1	1	1	1	1	1	1
43---------- Falaya	1	3	1	1	1	2	2	1	2	1	1	1	2	3	2	2	2	2	2	3	2
46:																					
Gullied land																					
Loring------	2	2	2	2	3	2	2	2	2	3	2	2	1	1	1	1	1	1	1	1	1
48:																					
Gullied land																					
Smithdale---	2	2	3	3	3	3	3	3	2	3	2	2	1	1	1	1	1	1	1	1	2
50---------- Udorthents.																					
60F1:																					
Natchez-----	3	2	2	2	2	2	2	2	2	2	2	2	1	3	1	1	1	1	1	1	1
Saffell-----	2	3	3	3	3	3	3	3	3	3	3	2	2	3	2	3	3	3	2	3	3
72---------- Crevasse	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
80---------- Bonn.																					
210--------- Adler	2	1	1	1	1	1	1	1	1	2	2	2	1	3	1	1	1	1	1	3	1
250--------- Morganfield	2	1	1	1	1	1	1	1	1	2	2	2	1	3	1	1	1	1	1	3	1
300--------- Sharkey.																					

TABLE 11.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1A Calloway	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
2A Dubbs	Slight	Slight	Slight	Slight	Slight.
3A Dundee	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
3C3 Dulac	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: slope, wetness.	Severe: erodes easily.	Moderate: wetness.
3D3 Dulac	Severe: wetness.	Moderate: slope, wetness, percs slowly.	Severe: slope, wetness.	Severe: erodes easily.	Moderate: wetness, slope.
4A Grenada	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
4B Grenada	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
5B2 Loring	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.
5C2, 5C3 Loring	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Slight	Slight.
5D3 Loring	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
6A Memphis	Slight	Slight	Slight	Severe: erodes easily.	Slight.
6B2 Memphis	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
6C2, 6C3 Memphis	Slight	Slight	Severe: slope.	Severe: erodes easily.	Slight.
6D3 Memphis	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
6E3, 6F2 Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
7F:					
Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Natchez	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
8C3 Providence	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness.
8D3 Providence	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
9F:					
Smithdale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Providence	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
Lexington	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
10E2 Smithdale	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
13 Bruno	Slight	Slight	Moderate: flooding.	Slight	Moderate: droughty, flooding.
14E:					
Maben	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Memphis	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
17:					
Chenneby	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Severe: erodes easily.	Severe: flooding.
Arkabutla	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding, wetness.
19:					
Bruno	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
Tutwiler	Slight	Slight	Moderate: slope.	Slight	Slight.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
20--- Alliqator	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
21--- Adler	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Slight---	Moderate: flooding.
22--- Arkabutla	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding, wetness.
23--- Chenneby	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Severe: erodes easily.	Severe: flooding.
24--- Forestdale	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
25--- Morqanfield	Severe: flooding.	Slight---	Moderate: flooding.	Slight---	Moderate: flooding.
26--- Oaklimeter	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
27--- Sharkey	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, flooding.	Severe: wetness, too clayey.	Severe: wetness, flooding, too clayey.
28--- Ariel	Severe: flooding.	Moderate: percs slowly.	Moderate: flooding, percs slowly.	Slight---	Moderate: flooding.
34E:					
Loring---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Memphis---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
43--- Falaya	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
46: Gullied land.					
Loring---	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
48: Gullied land.					
Smithdale---	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

TABLE 11.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
50. Udorthents.					
60F1: Natchez	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Saffell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
72 Crevasse	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
80 Bonn	Severe: flooding, wetness, percs slowly.	Severe: wetness, excess sodium, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: excess sodium, wetness.
210 Adler	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Slight	Slight.
250 Morganfield	Severe: flooding.	Slight	Slight	Slight	Slight.
300 Sharkey	Severe: ponding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, ponding.	Severe: wetness, too clayey.	Severe: wetness, ponding, too clayey.

TABLE 12.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1A---------- Calloway	Fair	Good	Good	Good	---	---	Fair	Fair	Good	Good	Fair.
2A---------- Dubbs	Good	Good	Good	Good	---	---	Poor	Very poor.	Good	Good	Very poor.
3A---------- Dundee	Fair	Good	Good	Good	---	---	Fair	Fair	Good	Good	Fair.
3C3, 3D3---------- Dulac	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
4A, 4B---------- Grenada	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
5B2---------- Loring	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
5C2, 5C3, 5D3------ Loring	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
6A, 6B2---------- Memphis	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
6C2, 6C3, 6D3------ Memphis	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
6E3, 6F2---------- Memphis	Very poor.	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
7F:											
Memphis----------	Very poor.	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Natchez----------	Poor	Fair	Good	Good	---	---	Very poor.	Very poor.	Fair	Good	Very poor.
8C3, 8D3---------- Providence	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
9F:											
Smithdale---------	Very poor.	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Providence--------	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Lexington---------	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
10E2---------- Smithdale	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
13---------- Bruno	Poor	Poor	Fair	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.

TABLE 12.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
14E:											
Maben	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
Memphis	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
17:											
Chenneby	Poor	Fair	Fair	Good	Good	---	Fair	Fair	Fair	Good	Fair.
Arkabutla	Poor	Fair	Fair	Good	Good	---	Fair	Fair	Fair	Good	Fair.
19:											
Bruno	Poor	Poor	Fair	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Tutwiler	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
20--- Alligator	Fair	Fair	Fair	Fair	Good	---	Good	Good	Fair	Fair	Good.
21--- Adler	Good	Good	Good	Good	Fair	Good	Poor	Poor	Good	Good	Poor.
22--- Arkabutla	Poor	Fair	Fair	Good	Good	---	Fair	Fair	Fair	Good	Fair.
23--- Chenneby	Poor	Fair	Fair	Good	Good	---	Fair	Fair	Fair	Good	Fair.
24--- Forestdale	Fair	Fair	Good	Fair	---	Fair	Good	Good	Fair	Fair	Good.
25--- Morganfield	Good	Good	Good	Good	---	---	Poor	Very poor.	Good	Good	Very poor.
26--- Oaklimeter	Good	Good	Good	Good	Poor	---	Poor	Poor	Good	Good	Poor.
27--- Sharkey	Poor	Poor	Fair	Good	---	Poor	Fair	Fair	Poor	Fair	Fair.
28--- Ariel	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
34E:											
Loring	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Memphis	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
43--- Falaya	Fair	Good	Good	Good	Good	---	Fair	Fair	Good	Good	Fair.
46: Gullied land.											
Loring	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

TABLE 12.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
48: Gullied land.											
Smithdale	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
50. Udorthents.											
60F1: Natchez	Poor	Fair	Good	Good	---	---	Very poor.	Very poor.	Fair	Good	Very poor.
Saffell	Very poor.	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
72---- Crevasse	Poor	Fair	Fair	Poor	Poor	---	Poor	Very poor.	Fair	Poor	Very poor.
80---- Bonn	Poor	Poor	Poor	Poor	---	Poor	Poor	Good	Poor	Poor	Fair.
210---- Adler	Good	Good	Good	Good	Fair	Good	Poor	Poor	Good	Good	Poor.
250---- Morganfield	Good	Good	Good	Good	---	---	Poor	Very poor.	Good	Good	Very poor.
300---- Sharkey	Poor	Poor	Fair	Good	---	Poor	Fair	Fair	Poor	Fair	Fair.

TABLE 13.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1A---------- Calloway	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
2A---------- Dubbs	Slight---------	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
3A---------- Dundee	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
3C3---------- Dulac	Severe: wetness.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
3D3---------- Dulac	Severe: wetness.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, slope.	Severe: low strength.	Moderate: wetness, slope.
4A, 4B---------- Grenada	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.	Moderate: wetness.
5B2---------- Loring	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.	Slight.
5C2, 5C3---------- Loring	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.	Slight.
5D3---------- Loring	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: slope.
6A, 6B2---------- Memphis	Slight---------	Slight---------	Slight---------	Slight---------	Severe: low strength.	Slight.
6C2, 6C3---------- Memphis	Slight---------	Slight---------	Slight---------	Moderate: slope.	Severe: low strength.	Slight.
6D3---------- Memphis	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
6E3, 6F2---------- Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
7F: Memphis----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Natchez----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

TABLE 13.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
8C3---------- Providence	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.	Moderate: wetness.
8D3---------- Providence	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: wetness, slope.
9F:						
Smithdale--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Providence-------	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: wetness, slope.
Lexington--------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
10E2---------- Smithdale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
13---------- Bruno	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.
14F:						
Maben----------	Moderate: too clayey, slope.	Severe: slope.	Moderate: slope, shrink-swell.	Severe: slope, slippage.	Severe: low strength.	Moderate: slope.
Memphis----------	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
17:						
Chenneby---------	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Severe: flooding.
Arkabutla--------	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding, wetness.
19:						
Bruno----------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.
Tutwiler---------	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
20---------- Alligator	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, too clayey.
21---------- Adler	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.

TABLE 13.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
22---------- Arkabutla	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding, wetness.
23---------- Chenneby	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Severe: flooding.
24---------- Forestdale	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, shrink-swell, wetness.	Severe: wetness.
25---------- Morganfield	Moderate: cutbanks cave, wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
26---------- Oaklimeter	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding.
27---------- Sharkey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding, too clayey.
28---------- Ariel	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
34E:						
Loring----------	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Memphis----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
43---------- Falaya	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.
46:						
Gullied land.						
Loring----------	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: slope.
48:						
Gullied land.						
Smithdale--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
50.						
Udorthents.						

TABLE 13.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
60F1: Natchez	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Saffell	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
72--- Crevasse	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: droughty.
80--- Bonn	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: excess sodium, wetness.
210--- Adler	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Slight.
250--- Morganfield	Moderate: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Slight.
300--- Sharkey	Severe: wetness.	Severe: ponding, wetness, shrink-swell.	Severe: ponding, wetness, shrink-swell.	Severe: ponding, wetness, shrink-swell.	Severe: low strength, wetness, ponding.	Severe: wetness, ponding, too clayey.

TABLE 14.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1A Calloway	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.
2A Dubbs	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
3A Dundee	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
3C3 Dulac	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
3D3 Dulac	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
4A Grenada	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
4B Grenada	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
5B2, 5C2, 5C3 Loring	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
5D3 Loring	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.
6A Memphis	Slight	Moderate: seepage.	Slight	Slight	Good.
6B2, 6C2, 6C3 Memphis	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
6D3 Memphis	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
6E3, 6F2 Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
7F: Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Natchez	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

TABLE 14.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
8C3---------- Providence	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
8D3---------- Providence	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
9F:					
Smithdale----------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Providence---------	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
Lexington----------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
10E2---------- Smithdale	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
13---------- Bruno	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: seepage, too sandy.
14E:					
Maben----------	Severe: percs slowly.	Severe: slope, slippage.	Moderate: slope.	Moderate: slope.	Fair: slope.
Memphis----------	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
17:					
Chenneby----------	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
Arkabutla----------	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.
19:					
Bruno----------	Severe: poor filter.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Poor: seepage, too sandy.
Tutwiler----------	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
20---------- Alligator	Severe: wetness, percs slowly.	Slight----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 14.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
21---------- Adler	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
22---------- Arkabutla	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness.
23---------- Chenneby	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
24---------- Forestdale	Severe: wetness, percs slowly.	Slight----------	Severe: wetness.	Severe: wetness.	Poor: wetness.
25---------- Morganfield	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
26---------- Oaklimeter	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
27---------- Sharkey	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
28---------- Ariel	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
34E: Loring----------	Severe: wetness, percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Memphis----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
43---------- Falaya	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
46: Gullied land.					
Loring----------	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.
48: Gullied land.					
Smithdale----------	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.

TABLE 14.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
50. Udorthents					
60F1: Natchez	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Saffell	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: small stones, slope.
72 Crevasse	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: seepage, too sandy.
80 Bonn	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, excess sodium.	Severe: flooding, wetness.	Poor: wetness, excess sodium.
210 Adler	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
250 Morganfield	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
300 Sharkey	Severe: ponding, wetness, percs slowly.	Severe: ponding, wetness.	Severe: ponding, wetness, too clayey.	Severe: ponding, wetness.	Poor: too clayey, hard to pack, wetness.

TABLE 15.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1A Calloway	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
2A Dubbs	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
3A Dundee	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
3C3 Dulac	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
3D3 Dulac	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, slope.
4A, 4B Grenada	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
5B2, 5C2, 5C3 Loring	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
5D3 Loring	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
6A, 6B2, 6C2, 6C3 Memphis	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
6D3 Memphis	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
6E3, 6F2 Memphis	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
7F: Memphis	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Natchez	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
8C3 Providence	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
8D3 Providence	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.

TABLE 15.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
9F:				
Smithdale	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Providence	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
Lexington	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
10E2--- Smithdale	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
13--- Bruno	Good	Probable	Improbable: too sandy.	Poor: too sandy.
14E:				
Maben	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Memphis	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
17:				
Chenneby	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Arkabutla	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
19:				
Bruno	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Tutwiler	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
20--- Alligator	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
21--- Adler	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
22--- Arkabutla	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
23--- Chenneby	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
24--- Forestdale	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
25--- Morganfield	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
26--- Oaklimeter	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

TABLE 15.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
27--- Sharkey	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
28--- Ariel	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
34E: Loring---	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Memphis---	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
43--- Falaya	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
46: Gullied land.				
Loring---	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
48: Gullied land.				
Smithdale---	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
50. Udorthents.				
60F1: Natchez---	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Saffell---	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
72--- Crevasse	Good---	Probable---	Improbable: too sandy.	Poor: too sandy.
80--- Bonn	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness, excess sodium.
210--- Adler	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
250--- Morganfield	Good---	Improbable: excess fines.	Improbable: excess fines.	Good.
300--- Sharkey	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.

TABLE 16.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1A---------- Calloway	Moderate: seepage.	Severe: thin layer.	Severe: no water.	Percs slowly---	Wetness, percs slowly.	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
2A---------- Dubbs	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
3A---------- Dundee	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Favorable------	Wetness--------	Erodes easily, wetness.	Erodes easily, rooting depth.
3C3---------- Dulac	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, rooting depth.	Erodes easily, wetness.	Wetness, erodes easily.
3D3---------- Dulac	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, rooting depth.	Slope, erodes easily, wetness.	Wetness, slope, erodes easily.
4A, 4B---------- Grenada	Moderate: seepage.	Severe: piping.	Severe: no water.	Percs slowly---	Wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, rooting depth.
5B2, 5C2, 5C3----- Loring	Moderate: seepage, slope.	Moderate: piping, wetness.	Severe: no water.	Slope, percs slowly.	Percs slowly, rooting depth, slope.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth.
5D3---------- Loring	Severe: slope.	Moderate: piping, wetness.	Severe: no water.	Slope, percs slowly.	Percs slowly, rooting depth, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
6A---------- Memphis	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
6B2, 6C2, 6C3----- Memphis	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
6D3, 6E3, 6F2----- Memphis	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.

TABLE 16.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
7F:							
Memphis	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Natchez	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
8C3 Providence	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Severe: no water.	Slope	Slope, wetness, rooting depth.	Erodes easily, wetness.	Erodes easily, rooting depth.
8D3 Providence	Severe: slope.	Moderate: thin layer, piping, wetness.	Severe: no water.	Slope	Slope, wetness, rooting depth.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
9F:							
Smithdale	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope	Slope.
Providence	Severe: slope.	Moderate: thin layer, piping, wetness.	Severe: no water.	Slope	Slope, wetness, rooting depth.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
Lexington	Severe: seepage, slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
10E2 Smithdale	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope	Slope.
13 Bruno	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty	Too sandy	Droughty.
14E:							
Maben	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Memphis	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.

TABLE 16.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
17:							
Chenneby	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Moderate: slow refill.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
Arkabutla	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
19:							
Bruno	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty	Too sandy	Droughty.
Tutwiler	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
20--Alligator	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly	Wetness, slow intake.	Wetness, percs slowly.	Wetness, percs slowly.
21--Adler	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
22--Arkabutla	Moderate: seepage.	Severe: wetness.	Moderate: slow refill.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
23--Chenneby	Moderate: seepage.	Severe: piping, hard to pack, wetness.	Moderate: slow refill.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
24--Forestdale	Slight	Severe: piping, wetness.	Severe: slow refill.	Percs slowly	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
25--Morganfield	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
26--Oaklimeter	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
27--Sharkey	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, rooting depth.

TABLE 16.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
28---------- Ariel	Moderate: seepage.	Severe: piping.	Severe: slow refill.	Flooding-------	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
34E: Loring----------	Severe: slope.	Moderate: piping, wetness.	Severe: no water.	Slope, percs slowly.	Percs slowly, rooting depth, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
Memphis----------	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
43---------- Palaya	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Flooding, poor outlets.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
46: Gullied land.							
Loring----------	Severe: slope.	Moderate: piping, wetness.	Severe: no water.	Slope, percs slowly.	Percs slowly, rooting depth, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
48: Gullied land.							
Smithdale--------	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
50. Udorthents.							
60F1: Natchez----------	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Saffell----------	Severe: slope, seepage.	Slight---------	Severe: no water.	Deep to water	Droughty, slope.	Slope----------	Slope, droughty.
72---------- Crevasse	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake.	Too sandy------	Droughty.
80---------- Bonn	Slight---------	Severe: wetness, excess sodium.	Severe: no water.	Percs slowly, flooding, excess sodium.	Wetness, droughty, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, excess sodium, erodes easily.

TABLE 16.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
210--Adler	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
250--Morganfield	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
300--Sharkey	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, ponding.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, rooting depth.

TABLE 17.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
1A---------- Calloway	0-20	Silt loam--------	CL-ML, CL	A-4, A-6	100	100	100	90-100	25-35	5-15
	20-26	Silt loam, silty clay loam.	CL	A-6	100	100	100	90-95	30-40	12-20
	26-60	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	100	100	100	90-100	25-35	5-15
2A---------- Dubbs	0-5	Silt loam--------	ML, CL-ML, CL	A-4	100	100	100	60-90	20-35	3-10
	5-25	Silty clay loam, clay loam, sandy clay loam.	CL	A-6, A-7	100	100	100	85-100	35-50	15-25
	25-60	Loam, silt loam, very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	100	100	85-95	55-90	20-35	3-14
3A---------- Dundee	0-9	Silt loam--------	CL, CL-ML, ML	A-4, A-6	100	100	90-100	75-98	20-35	3-11
	9-32	Silty clay loam, clay loam, sandy clay loam.	CL	A-6, A-7	100	100	90-100	70-95	28-44	12-22
	32-72	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	100	100	85-100	60-90	<30	NP-8
3C3, 3D3---------- Dulac	0-2	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	85-95	20-25	2-7
	2-17	Silt loam, silty clay loam.	CL	A-6, A-7	100	100	90-100	85-95	30-45	11-25
	17-30	Silt loam, silty clay loam.	CL	A-6, A-7	100	95-100	90-100	85-95	30-45	11-25
	30-65	Clay, silty clay	CH, MH	A-7	95-100	90-100	85-100	80-95	55-85	25-50
4A, 4B---------- Grenada	0-4	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	90-100	25-31	4-7
	4-21	Silt loam, silty clay loam.	CL	A-6, A-4	100	100	95-100	90-100	27-40	8-19
	21-25	Silt loam, silt.	CL-ML, CL	A-4	100	100	95-100	90-100	20-30	5-10
	25-70	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-7, A-4	100	100	95-100	90-100	25-45	5-24
5B2, 5C2, 5C3, 5D3---------- Loring	0-5	Silt loam--------	ML, CL-ML, CL	A-4, A-6	100	100	95-100	90-100	<35	NP-15
	5-24	Silt loam, silty clay loam.	CL, ML	A-6, A-7, A-4	100	100	95-100	90-100	32-48	10-20
	24-48	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	100	100	95-100	90-100	30-45	10-22
	48-65	Silt loam--------	CL, ML	A-4, A-6	100	100	95-100	70-100	28-40	7-16
6A, 6B2, 6C2, 6C3, 6D3, 6E3, 6F2---------- Memphis	0-4	Silt loam--------	ML, CL-ML, CL	A-4	100	100	100	90-100	<30	NP-10
	4-19	Silt loam, silty clay loam.	CL	A-6, A-7	100	100	100	90-100	35-48	15-25
	19-90	Silt loam--------	ML, CL	A-4, A-6	100	100	100	90-100	30-40	6-15

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
7F:										
Memphis	0-4	Silt loam	ML, CL-ML, CL	A-4	100	100	100	90-100	<30	NP-10
	4-19	Silt loam, silty clay loam.	CL	A-6, A-7	100	100	100	90-100	35-48	15-25
	19-90	Silt loam	ML, CL	A-4, A-6	100	100	100	90-100	30-40	6-15
Natchez	0-22	Silt loam	ML, CL-ML, CL	A-4	100	100	100	85-100	<30	NP-10
	22-78	Silt loam, silt	ML, CL-ML	A-4	100	100	100	85-100	<30	NP-7
8C3, 8D3 Providence	0-3	Silt loam	ML, CL, CL-ML	A-4	100	100	100	85-100	<30	NP-10
	3-21	Silty clay loam, silt loam.	CL	A-7, A-6	100	100	95-100	85-100	30-45	11-20
	21-34	Silt loam, silty clay loam.	CL	A-6	100	100	90-100	70-90	25-40	11-20
	34-42	Loam, clay loam, sandy clay loam.	CL, SC	A-6, A-4	100	95-100	70-95	40-80	20-35	8-18
	42-65	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4	100	95-100	60-85	30-80	<30	NP-10
9F:										
Smithdale	0-8	Sandy loam	SM, SM-SC	A-4, A-2	100	85-100	60-95	28-49	<20	NP-5
	8-21	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	100	85-100	80-96	45-75	23-38	7-16
	21-80	Loam, sandy loam	SM, ML, CL, SC	A-4	100	85-100	65-95	36-70	<30	NP-10
Providence	0-3	Silt loam	ML, CL, CL-ML	A-4	100	100	100	85-100	<30	NP-10
	3-21	Silty clay loam, silt loam.	CL	A-7, A-6	100	100	95-100	85-100	30-45	11-20
	21-34	Silt loam, silty clay loam.	CL	A-6	100	100	90-100	70-90	25-40	11-20
	34-42	Loam, clay loam, sandy clay loam.	CL, SC	A-6, A-4	100	95-100	70-95	40-80	20-35	8-18
	42-65	Sandy loam, sandy clay loam, loam.	SM, SC, CL, ML	A-2, A-4	100	95-100	60-85	30-80	<30	NP-10
Lexington	0-4	Silt loam	ML, CL, CL-ML	A-4, A-6, A-7	100	95-100	90-100	70-100	25-42	5-16
	4-35	Silty clay loam, silt loam.	CL	A-6, A-7	100	95-100	90-100	75-100	27-45	11-25
	35-53	Sandy loam, loam, silt loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	100	95-100	50-85	20-65	22-35	5-15
	53-70	Loamy sand, sandy loam, clay loam.	SC, SM-SC	A-2, A-4, A-6	100	95-100	50-70	20-40	22-35	5-15
10E2 Smithdale	0-8	Sandy loam	SM, SM-SC	A-4, A-2	100	85-100	60-95	28-49	<20	NP-5
	8-21	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	100	85-100	80-96	45-75	23-38	7-16
	21-80	Loam, sandy loam	SM, ML, CL, SC	A-4	100	85-100	65-95	36-70	<30	NP-10
13	0-8	Sandy loam	SM, ML	A-4, A-2	100	100	60-85	30-60	<25	NP-3
Bruno	8-70	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2	100	100	60-80	10-30	---	NP

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
14E:										
Maben	0-3	Silt loam	CL-ML, CL	A-4, A-6	95-100	90-100	80-95	50-70	15-40	5-20
	3-22	Clay, clay loam, silty clay.	MH	A-7	90-100	90-100	90-100	75-95	50-80	18-40
	22-36	Stratified loam to weathered bedrock.	CL, ML, CH, MH	A-6, A-7	95-100	80-95	70-90	60-75	30-60	11-25
	36-60	Stratified fine sandy loam to weathered bedrock.	SC, SM-SC, CL, CL-ML	A-4, A-6	95-100	80-95	70-85	40-55	20-36	5-20
Memphis	0-4	Silt loam	ML, CL-ML, CL	A-4	100	100	100	90-100	<30	NP-10
	4-19	Silt loam, silty clay loam.	CL	A-6, A-7	100	100	100	90-100	35-48	15-25
	19-80	Silt loam	ML, CL	A-4, A-6	100	100	100	90-100	30-40	6-15
17:										
Chenneby	0-21	Silt loam	CL, ML	A-4, A-6	100	95-100	90-100	60-90	20-35	3-15
	21-65	Loam, silt loam, silty clay loam.	CL, ML, MH, CH	A-4, A-6, A-7	100	95-100	90-100	75-95	30-55	8-20
Arkabutla	0-5	Silt loam	CL, CL-ML	A-4, A-6	100	100	85-100	60-95	25-35	7-15
	5-60	Silty clay loam, loam, silt loam.	CL	A-6, A-7	100	100	85-100	70-90	30-45	12-25
19:										
Bruno	0-8	Sandy loam	SM, ML	A-4, A-2	100	100	60-85	30-60	<25	NP-3
	8-70	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2	100	100	60-80	10-30	---	NP
Tutwiler	0-5	Very fine sandy loam.	ML, CL-ML	A-4	100	100	90-100	70-95	<25	NP-6
	5-47	Loam, silt loam, fine sandy loam.	ML, CL-ML	A-4	100	100	95-100	85-100	<30	NP-7
	47-60	Loamy very fine sand, fine sandy loam.	SM, ML, CL-ML, SM-SC	A-4	100	100	85-100	40-65	<25	NP-4
20	0-5	Silty clay	CH	A-7	100	100	95-100	95-100	52-75	30-50
Alligator	5-50	Silty clay, clay	CH	A-7	100	100	100	95-100	62-94	33-64
	50-60	Silty clay loam, silty clay, clay.	CH	A-7	100	100	100	95-100	62-94	33-64
21	0-7	Silt loam	ML, CL-ML	A-4	100	100	100	95-100	<28	NP-7
Adler	7-60	Silt loam, silt, very fine sandy loam.	ML, CL, CL-ML	A-4	100	100	95-100	60-95	<30	NP-10
22	0-5	Silt loam	CL, CL-ML	A-4, A-6	100	100	85-100	60-95	25-35	7-15
Arkabutla	5-60	Silty clay loam, loam, silt loam.	CL	A-6, A-7	100	100	85-100	70-90	30-45	12-25
23	0-21	Silt loam	CL, ML	A-4, A-6	100	95-100	90-100	60-90	20-35	3-15
Chenneby	21-65	Loam, silt loam, silty clay loam.	CL, ML, MH, CH	A-4, A-6, A-7	100	95-100	90-100	75-95	30-55	8-20

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Map Symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
24---------- Forestdale	0-6	Silt loam--------	CL, CL-ML	A-4, A-6	100	100	95-100	80-95	10-30	5-15
	6-34	Silty clay, clay, silty clay loam.	CH, CL	A-7	100	100	95-100	90-100	40-65	20-40
	34-60	Silty clay loam, silt loam, very fine sandy loam.	CL, CL-ML	A-6, A-7, A-4	100	100	95-100	75-100	20-50	5-30
25---------- Morganfield	0-6	Silt loam--------	ML, CL, CL-ML	A-4	100	100	95-100	65-95	<30	NP-10
	6-60	Silt loam, silt, very fine sandy loam.	ML, CL, CL-ML	A-4	100	100	95-100	65-95	<30	NP-10
26---------- Oaklimeter	0-7	Silt loam--------	ML, CL, CL-ML	A-4	100	100	90-100	70-90	<30	NP-8
	7-33	Very fine sandy loam, silt loam, loam.	ML, CL, CL-ML	A-4	100	100	85-95	60-85	<30	NP-8
	33-65	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4	100	100	90-100	90-100	<30	NP-10
27---------- Sharkey	0-4	Clay-------------	CH, CL	A-7-6, A-7-5	100	100	100	95-100	46-85	22-50
	4-50	Clay-------------	CH	A-7-6, A-7-5	100	100	100	95-100	56-85	30-50
	50-70	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	100	100	100	95-100	32-85	11-50
28---------- Ariel	0-40	Silt-------------	ML, CL-ML	A-4	100	100	90-100	85-95	<30	NP-7
	40-60	Silt loam, silt, silty clay loam.	ML, CL, CL-ML	A-4	100	100	85-100	70-90	<30	NP-10
34E: Loring----------	0-5	Silt loam--------	ML, CL-ML, CL	A-4, A-6	100	100	95-100	90-100	<35	NP-15
	5-24	Silt loam, silty clay loam.	CL, ML	A-6, A-7, A-4	100	100	95-100	90-100	32-48	10-20
	24-48	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	100	100	95-100	90-100	30-45	10-22
	48-65	Silt loam--------	CL, ML	A-4, A-6	100	100	95-100	70-100	28-40	7-16
Memphis---------	0-4	Silt loam--------	ML, CL-ML, CL	A-4	100	100	100	90-100	<30	NP-10
	4-19	Silt loam, silty clay loam.	CL	A-6, A-7	100	100	100	90-100	35-48	15-25
	19-90	Silt loam--------	ML, CL	A-4, A-6	100	100	100	90-100	30-40	6-15
43---------- Falaya	0-28	Silt-------------	ML, CL-ML, CL	A-4	100	100	100	95-100	<30	NP-10
	28-65	Silt loam, silty clay loam.	ML, CL	A-4, A-6, A-7	100	100	100	95-100	25-43	7-16
46: Gullied land.										
Loring----------	0-5	Silt loam--------	ML, CL-ML, CL	A-4, A-6	100	100	95-100	90-100	<35	NP-15
	5-24	Silt loam, silty clay loam.	CL, ML	A-6, A-7, A-4	100	100	95-100	90-100	32-48	10-20
	24-48	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	100	100	95-100	90-100	30-45	10-22
	48-65	Silt loam--------	CL, ML	A-4, A-6	100	100	95-100	70-100	28-40	7-16

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
48: Gullied land.										
Smithdale-------	0-8	Sandy loam-------	SM, SM-SC	A-4, A-2	100	85-100	60-95	28-49	<20	NP-5
	8-21	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	100	85-100	80-96	45-75	23-38	7-16
	21-80	Loam, sandy loam	SM, ML, CL, SC	A-4	100	85-100	65-95	36-70	<30	NP-10
50. Udorthents.										
60F1: Natchez---------	0-22	Silt loam--------	ML, CL-ML, CL	A-4	100	100	100	85-100	<30	NP-10
	22-78	Silt loam, silt	ML, CL-ML	A-4	100	100	100	85-100	<30	NP-7
Saffell---------	0-4	Fine sandy loam	SM, ML	A-2, A-4	95-100	90-100	55-80	20-55	<20	NP-3
	4-9	Gravelly fine sandy loam, gravelly sandy clay loam, gravelly loam.	GC, SC, SM-SC, GM-GC	A-2, A-1	35-85	25-70	20-55	15-35	20-40	4-18
	9-37	Very gravelly sandy clay loam, very gravelly fine sandy loam, very gravelly loam.	GC, SC, SM-SC, GM-GC	A-2, A-1	35-85	25-65	20-55	15-35	20-40	4-18
	37-60	Gravelly sandy loam, very gravelly sandy loam, gravelly loamy sand.	GM, GC, SM, SC	A-1, A-2, A-3	25-80	10-70	5-60	5-35	<35	NP-15
72---------- Crevasse	0-4	Sand----------	SP-SM, SM	A-2-4, A-3	100	95-100	50-100	5-20	---	NP
	4-60	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2, A-3	100	95-100	50-100	5-20	---	NP
80---------- Bonn	0-20	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	75-100	<28	NP-7
	20-52	Silt loam, silty clay loam.	CL	A-6, A-7-6	95-100	90-100	85-100	65-100	30-44	12-22
	52-65	Silt loam, silty clay loam.	CL	A-6, A-4	100	95-100	90-100	75-100	28-40	8-18
210---------- Adler	0-7	Silt loam--------	ML, CL-ML	A-4	100	100	100	95-100	<28	NP-7
	7-60	Silt loam, silt, very fine sandy loam.	ML, CL, CL-ML	A-4	100	100	95-100	60-95	<30	NP-10
250---------- Morganfield	0-6	Silt loam--------	ML, CL, CL-ML	A-4	100	100	95-100	65-95	<30	NP-10
	6-60	Silt loam, silt, very fine sandy loam.	ML, CL, CL-ML	A-4	100	100	95-100	65-95	<30	NP-10

TABLE 17.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
300---------- Sharkey	0-4	Clay----------	CH, CL	A-7-6, A-7-5	100	100	100	95-100	46-85	22-50
	4-50	Clay----------	CH	A-7-6, A-7-5	100	100	100	95-100	56-85	30-50
	50-70	Clay, silty clay loam, silt loam.	CL, CH	A-6, A-7-6, A-7-5	100	100	100	95-100	32-85	11-50

TABLE 18.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
1A	0-20	10-30	1.40-1.55	0.6-2.0	0.20-0.23	4.5-6.0	Low	0.49	3	.5-2
Calloway	20-26	10-32	1.35-1.55	0.06-0.2	0.09-0.12	4.5-6.0	Low	0.43		
	26-60	16-32	1.45-1.55	0.06-0.2	0.09-0.12	5.1-7.8	Low	0.43		
2A	0-5	5-18	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low	0.37	5	.5-2
Dubbs	5-25	20-35	1.45-1.55	0.6-2.0	0.18-0.22	4.5-6.0	Moderate	0.37		
	25-60	10-25	1.40-1.50	2.0-6.0	0.20-0.22	4.5-6.0	Low	0.37		
3A	0-9	10-30	1.30-1.80	0.6-2.0	0.15-0.20	4.5-6.0	Low	0.43	5	.5-1
Dundee	9-32	18-34	1.30-1.80	0.2-0.6	0.15-0.20	4.5-6.0	Moderate	0.32		
	32-72	18-25	1.30-1.80	0.6-2.0	0.15-0.20	4.5-7.3	Low	0.32		
3C3, 3D3	0-2	6-18	1.20-1.40	0.6-2.0	0.20-0.22	4.5-5.5	Low	0.49	3	.5-2
Dulac	2-17	20-30	1.40-1.60	0.6-2.0	0.20-0.22	4.5-5.5	Low	0.43		
	17-30	20-35	1.60-1.80	0.06-0.2	0.10-0.13	4.5-5.5	Low	0.43		
	30-65	40-55	1.50-1.70	0.2-0.6	0.10-0.14	4.5-5.5	High	0.20		
4A, 4B	0-4	12-16	1.40-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low	0.49	3	.5-2
Grenada	4-21	18-30	1.40-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low	0.43		
	21-25	12-16	1.35-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low	0.49		
	25-70	15-32	1.45-1.60	0.06-0.2	0.10-0.12	4.5-7.3	Low	0.37		
5B2, 5C2, 5C3, 5D3	0-5	8-18	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low	0.49	3	.5-2
Loring	5-24	18-32	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low	0.43		
	24-48	15-30	1.50-1.70	0.06-0.2	0.06-0.13	4.5-6.0	Low	0.43		
	48-65	10-25	1.30-1.60	0.2-2.0	0.06-0.13	4.5-6.5	Low	0.43		
6A, 6B2, 6C2, 6C3, 6D3, 6E3, 6F2	0-4	8-22	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low	0.49	5	1-2
Memphis	4-19	20-35	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low	0.49		
	19-90	12-25	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low	0.49		
7F:										
Memphis	0-4	8-22	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low	0.49	5	1-2
	4-19	20-35	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low	0.49		
	19-90	12-25	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low	0.49		
Natchez	0-22	8-18	1.30-1.45	0.6-2.0	0.20-0.24	5.1-7.3	Low	0.37	5	.5-3
	22-78	8-15	1.35-1.45	0.6-2.0	0.20-0.24	6.6-8.4	Low	0.37		
8C3, 8D3	0-3	5-12	1.30-1.40	0.6-2.0	0.20-0.22	4.5-6.0	Low	0.49	3	.5-3
Providence	3-21	18-30	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low	0.43		
	21-34	20-30	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Low	0.32		
	34-42	12-30	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Low	0.32		
	42-65	10-27	1.40-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low	0.32		

TABLE 18.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
9F:										
Smithdale-------	0-8	2-15	1.40-1.50	2.0-6.0	0.14-0.16	4.5-5.5	Low----------	0.28	5	.5-2
	8-21	18-33	1.40-1.55	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.24		
	21-80	12-27	1.40-1.55	2.0-6.0	0.14-0.16	4.5-5.5	Low----------	0.28		
Providence------	0-3	5-12	1.30-1.40	0.6-2.0	0.20-0.22	4.5-6.0	Low----------	0.49	3	.5-3
	3-21	18-30	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low----------	0.43		
	21-34	20-30	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Low----------	0.32		
	34-42	12-30	1.40-1.60	0.2-0.6	0.08-0.10	4.5-6.0	Low----------	0.32		
	42-65	10-27	1.40-1.60	0.6-2.0	0.10-0.15	4.5-6.0	Low----------	0.32		
Lexington-------	0-4	12-30	1.30-1.50	0.6-2.0	0.17-0.22	4.5-6.0	Low----------	0.49	3	.5-2
	4-35	20-33	1.40-1.55	0.6-2.0	0.16-0.21	4.5-6.0	Low----------	0.43		
	35-53	15-29	1.30-1.50	2.0-6.0	0.06-0.12	4.5-6.0	Low----------	0.24		
	53-70	9-30	1.20-1.55	2.0-6.0	0.05-0.10	4.5-6.0	Low----------	0.24		
10E2------------	0-8	2-15	1.40-1.50	2.0-6.0	0.14-0.16	4.5-5.5	Low----------	0.28	5	.5-2
Smithdale	8-21	18-33	1.40-1.55	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.24		
	21-80	12-27	1.40-1.55	2.0-6.0	0.14-0.16	4.5-5.5	Low----------	0.28		
13---------------	0-8	3-10	1.40-1.55	6.0-20	0.10-0.15	5.1-8.4	Low----------	0.17	5	.5-2
Bruno	8-70	2-8	1.40-1.60	6.0-20	0.05-0.10	5.1-8.4	Low----------	0.15		
14E:										
Maben-----------	0-3	15-25	1.40-1.50	0.6-2.0	0.15-0.20	5.6-6.5	Low----------	0.37	3	.5-1
	3-22	35-55	1.45-1.55	0.2-0.6	0.14-0.18	4.5-6.0	High---------	0.28		
	22-36	---	---	0.2-0.6	0.14-0.18	4.5-6.0	Moderate-----	0.28		
	36-60	---	---	0.2-0.6	0.10-0.15	4.5-6.0	Low----------	----		
Memphis---------	0-4	8-22	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low----------	0.49	5	1-2
	4-19	20-35	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low----------	0.49		
	19-80	12-25	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low----------	0.49		
17:										
Chenneby--------	0-21	12-27	1.30-1.60	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.37	5	.5-3
	21-65	12-35	1.30-1.50	0.6-2.0	0.15-0.20	4.5-6.0	Low----------	0.32		
Arkabutla-------	0-5	5-25	1.40-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low----------	0.43	5	1-3
	5-60	20-35	1.45-1.55	0.6-2.0	0.18-0.21	4.5-5.5	Low----------	0.32		
19:										
Bruno-----------	0-8	3-10	1.40-1.55	6.0-20	0.10-0.15	5.1-8.4	Low----------	0.17	5	.5-2
	8-70	2-8	1.40-1.60	6.0-20	0.05-0.10	5.1-8.4	Low----------	0.15		
Tutwiler--------	0-5	8-15	1.40-1.50	0.6-2.0	0.15-0.20	4.5-6.0	Low----------	0.37	5	.5-2
	5-47	8-16	1.40-1.50	0.6-2.0	0.15-0.20	4.5-6.0	Low----------	0.24		
	47-60	8-15	1.40-1.50	2.0-6.0	0.07-0.15	4.5-6.0	Low----------	0.17		
20---------------	0-5	40-60	1.40-1.50	<0.06	0.18-0.20	4.5-5.5	High---------	0.32	5	1-3
Alligator	5-50	60-85	1.45-1.55	<0.06	0.14-0.18	4.5-5.5	Very high----	0.24		
	50-60	35-85	1.45-1.55	<0.06	0.14-0.18	6.1-7.3	Very high----	0.24		
21---------------	0-7	10-25	1.50-1.55	0.6-2.0	0.20-0.23	5.6-7.8	Low----------	0.43	5	.5-2
Adler	7-60	5-18	1.50-1.55	0.6-2.0	0.20-0.23	5.1-7.8	Low----------	0.43		

TABLE 18.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
22----------	0-5	5-25	1.40-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low----------	0.43	5	1-3
Arkabutla	5-60	20-35	1.45-1.55	0.6-2.0	0.18-0.21	4.5-5.5	Low----------	0.32		
23----------	0-21	12-27	1.30-1.60	0.6-2.0	0.14-0.20	4.5-6.0	Low----------	0.37	5	.5-3
Chenneby	21-65	12-35	1.30-1.50	0.6-2.0	0.15-0.20	4.5-6.0	Low----------	0.32		
24----------	0-6	10-25	1.50-1.55	0.2-0.6	0.20-0.22	4.5-6.0	Low----------	0.43	5	---
Forestdale	6-34	35-60	1.50-1.60	<0.06	0.14-0.18	4.5-6.0	High---------	0.28		
	34-60	10-35	1.45-1.55	0.2-0.6	0.17-0.22	4.5-7.8	Moderate-----	0.37		
25----------	0-6	2-5	1.40-1.50	0.6-2.0	0.20-0.23	5.6-7.8	Low----------	0.43	5	1-3
Morganfield	6-60	5-18	1.40-1.55	0.6-2.0	0.20-0.23	5.1-7.8	Low----------	0.43		
26----------	0-7	10-16	1.40-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low----------	0.43	5	.5-2
Oaklimeter	7-33	7-18	1.40-1.50	0.6-2.0	0.15-0.20	4.5-5.5	Low----------	0.43		
	33-65	7-30	1.40-1.50	0.6-2.0	0.20-0.20	4.5-5.5	Low----------	0.43		
27----------	0-4	40-60	1.20-1.50	<0.06	0.12-0.18	5.1-8.4	Very high----	0.32	5	.5-4
Sharkey	4-50	60-90	1.20-1.50	<0.06	0.12-0.18	5.6-8.4	Very high----	0.28		
	50-70	25-90	1.20-1.65	0.06-0.2	0.12-0.18	6.6-8.4	High---------	0.28		
28----------	0-40	12-18	1.40-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low----------	0.43	5	.5-2
Ariel	40-60	7-27	1.40-1.50	0.2-0.6	0.16-0.20	4.5-5.5	Low----------	0.43		
34E:										
Loring----------	0-5	8-18	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low----------	0.49	3	.5-2
	5-24	18-32	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low----------	0.43		
	24-48	15-30	1.50-1.70	0.06-0.2	0.06-0.13	4.5-6.0	Low----------	0.43		
	48-65	10-25	1.30-1.60	0.2-2.0	0.06-0.13	4.5-6.5	Low----------	0.43		
Memphis---------	0-4	8-22	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low----------	0.49	5	1-2
	4-19	20-35	1.30-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low----------	0.49		
	19-90	12-25	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low----------	0.49		
43----------	0-28	6-18	1.25-1.45	0.6-2.0	0.20-0.22	4.5-5.5	Low----------	0.49	5	.5-3
Falaya	28-65	6-32	1.25-1.50	0.06-2.0	0.14-0.22	4.5-5.5	Low----------	0.43		
46:										
Gullied land.										
Loring----------	0-5	8-18	1.30-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low----------	0.49	3	.5-2
	5-24	18-32	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low----------	0.43		
	24-48	15-30	1.50-1.70	0.06-0.2	0.06-0.13	4.5-6.0	Low----------	0.43		
	48-65	10-25	1.30-1.60	0.2-2.0	0.06-0.13	4.5-6.5	Low----------	0.43		
48:										
Gullied land.										
Smithdale-------	0-8	2-15	1.40-1.50	2.0-6.0	0.14-0.16	4.5-5.5	Low----------	0.28	5	.5-2
	8-21	18-33	1.40-1.55	0.6-2.0	0.15-0.17	4.5-5.5	Low----------	0.24		
	21-80	12-27	1.40-1.55	2.0-6.0	0.14-0.16	4.5-5.5	Low----------	0.28		
50.										
Udorthents.										

TABLE 18.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cc	In/hr	In/in	pH				Pct
60F1:										
Natchez	0-22	8-18	1.30-1.45	0.6-2.0	0.20-0.24	5.1-7.3	Low	0.37	5	.5-3
	22-78	8-15	1.35-1.45	0.6-2.0	0.20-0.24	6.6-8.4	Low	0.37		
Saffell	0-4	5-20	1.30-1.60	2.0-6.0	0.07-0.15	4.5-5.5	Low	0.24	4	1-2
	4-9	10-35	1.25-1.60	0.6-2.0	0.06-0.10	4.5-5.5	Low	0.28		
	9-37	12-35	1.25-1.60	0.6-2.0	0.06-0.12	4.5-5.5	Low	0.28		
	37-60	10-25	1.30-1.65	0.6-6.0	0.04-0.11	4.5-5.5	Low	0.17		
72	0-4	2-8	1.40-1.50	6.0-20	0.02-0.06	5.6-8.4	Low	0.15	5	.5-2
Crevasse	4-60	2-8	1.40-1.50	6.0-20	0.02-0.06	5.6-8.4	Low	0.15		
80	0-20	5-15	1.30-1.50	0.2-0.6	0.15-0.23	4.5-7.3	Low	0.49	3	.5-2
Bonn	20-52	18-35	1.40-1.75	<0.06	0.08-0.14	5.6-9.0	Low	0.49		
	52-65	15-35	1.40-1.75	<0.2	0.08-0.14	6.6-9.0	Low	0.49		
210	0-7	10-25	1.50-1.55	0.6-2.0	0.20-0.23	5.6-7.8	Low	0.43	5	.5-2
Adler	7-60	5-18	1.50-1.55	0.6-2.0	0.20-0.23	5.1-7.8	Low	0.43		
250	0-6	2-5	1.40-1.50	0.6-2.0	0.20-0.23	5.6-7.8	Low	0.43	5	1-3
Morganfield	6-60	5-18	1.40-1.55	0.6-2.0	0.20-0.23	5.1-7.8	Low	0.43		
300	0-4	40-60	1.20-1.50	<0.06	0.12-0.18	5.1-8.4	Very high	0.32	5	.5-4
Sharkey	4-50	60-90	1.20-1.50	<0.06	0.12-0.18	5.6-8.4	Very high	0.28		
	50-70	25-90	1.20-1.65	0.06-0.2	0.12-0.18	6.6-8.4	High	0.28		

TABLE 19.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
1A---------- Calloway	C	None--------	---	---	1.0-2.0	Perched	Jan-Apr	High------	Moderate.
2A---------- Dubbs	B	None--------	---	---	>6.0	---	---	Moderate	Moderate.
3A---------- Dundee	C	None--------	---	---	1.5-3.5	Apparent	Jan-Apr	High------	Moderate.
3C3, 3D3-------- Dulac	C	None--------	---	---	1.0-2.0	Perched	Dec-Apr	Moderate	High.
4A, 4B---------- Grenada	C	None--------	---	---	1.5-2.5	Perched	Jan-Apr	Moderate	Moderate.
5B2, 5C2, 5C3, 5D3---------- Loring	C	None--------	---	---	2.0-3.0	Perched	Dec-Mar	Moderate	Moderate.
6A, 6B2, 6C2, 6C3, 6D3, 6E3, 6F2---------- Memphis	B	None--------	---	---	>6.0	---	---	Moderate	Moderate.
7F:									
Memphis--------	B	None--------	---	---	>6.0	---	---	Moderate	Moderate.
Natchez--------	B	None--------	---	---	>6.0	---	---	Low-------	Low.
8C3, 8D3-------- Providence	C	None--------	---	---	1.5-3.0	Perched	Jan-Mar	Moderate	Moderate.
9F:									
Smithdale------	B	None--------	---	---	>6.0	---	---	Low-------	Moderate.
Providence-----	C	None--------	---	---	1.5-3.0	Perched	Jan-Mar	Moderate	Moderate.
Lexington------	B	None--------	---	---	>6.0	---	---	Moderate	Moderate.
10E2---------- Smithdale	B	None--------	---	---	>6.0	---	---	Low-------	Moderate.
13---------- Bruno	A	Occasional	Brief----	Dec-Jun	4.0-6.0	Apparent	Dec-Apr	Low-------	Low.
14E:									
Maben----------	C	None--------	---	---	>6.0	---	---	High------	Moderate.
Memphis--------	B	None--------	---	---	>6.0	---	---	Moderate	Moderate.
17:									
Chenneby-------	C	Frequent----	Brief----	Jan-Apr	1.0-2.5	Apparent	Jan-Apr	High------	Moderate.
Arkabutla------	C	Frequent----	Brief----	Jan-Apr	1.0-1.5	Apparent	Jan-Apr	High------	High.

TABLE 19.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
19:									
Bruno	A	Rare	---	---	4.0-6.0	Apparent	Dec-Apr	Low	Low.
Tutwiler	B	None	---	---	>6.0	---	---	Moderate	High.
20--- Alligator	D	Rare	---	---	0.5-2.0	Apparent	Jan-Apr	High	Moderate.
21--- Adler	C	Occasional	Brief	Jan-Apr	2.0-3.0	Apparent	Jan-Apr	Moderate	Low.
22--- Arkabutla	C	Frequent	Long	Jan-Apr	1.0-1.5	Apparent	Jan-Mar	High	High.
23--- Chenneby	C	Frequent	Brief	Jan-Apr	1.0-2.5	Apparent	Jan-Mar	High	Moderate.
24--- Forestdale	D	Rare	---	---	0.5-2.0	Apparent	Jan-Apr	High	Moderate.
25--- Morganfield	B	Occasional	Brief	Jan-Apr	3.0-4.0	Apparent	Jan-Apr	Low	Low.
26--- Oaklimeter	C	Occasional	Brief	Nov-Apr	1.5-2.5	Apparent	Nov-Mar	Moderate	High.
27--- Sharkey	D	Frequent	Brief to long.	Dec-Jul	0-2.0	Apparent	Dec-Apr	High	Low.
28--- Ariel	C	Occasional	Brief	Jan-Apr	2.5-4.0	Apparent	Jan-Apr	Low	Moderate.
34E:									
Loring	C	None	---	---	2.0-3.0	Perched	Dec-Mar	Moderate	Moderate.
Memphis	B	None	---	---	>6.0	---	---	Moderate	Moderate.
43--- Falaya	D	Occasional	Brief to long.	Dec-Apr	1.0-2.0	Apparent	Dec-Apr	High	Moderate.
46: Gullied land.									
Loring	C	None	---	---	2.0-3.0	Perched	Dec-Mar	Moderate	Moderate.
48: Gullied land.									
Smithdale	B	None	---	---	>6.0	---	---	Low	Moderate.
50. Udorthents.									
60F1:									
Natchez	B	None	---	---	>6.0	---	---	Low	Low.
Saffell	B	None	---	---	>6.0	---	---	Low	Moderate.

TABLE 19.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
72---------- Crevasse	A	Occasional	Brief----	Oct-Mar	3.5-6.0	Apparent	Nov-Mar	Low-------	Moderate.
80---------- Bonn	D	Occasional	Brief----	Nov-Jun	0-2.0	Perched	Dec-Apr	High------	Low.
210---------- Adler	C	Rare--------	---	---	2.0-3.0	Apparent	Jan-Apr	Moderate	Low.
250---------- Morganfield	B	Rare--------	---	---	3.0-4.0	Apparent	Jan-Apr	Low-------	Low.
300---------- Sharkey	D	Ponded------	---	Jan-Dec	+3.0	Apparent	Jan-Dec	High------	Low.

TABLE 20.--PHYSICAL ANALYSES OF SELECTED SOILS

[Analyses by the Soil Genesis and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station, Mississippi State University]

Soil series	Horizon	Depth	Particle-size distribution							
			Very coarse sand (2.0-1.0 mm)	Coarse sand (1.0-0.5 mm)	Medium sand (0.5-0.25 mm)	Fine sand (0.25-0.10 mm)	Very fine sand (0.10-0.05 mm)	Total sand (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)
		In	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct
Alligator: 1/										
S81MS-015-02	Ap	0-5	0.4	0.2	0.3	0.7	0.6	2.2	40.5	57.3
	Bg1	5-19	0.2	0.4	0.8	0.7	0.3	2.4	35.3	62.3
	Bg2	19-41	0.1	0.3	0.3	0.4	0.2	1.3	35.0	63.7
	Bg3	41-50	0.2	0.3	0.4	0.5	0.3	1.7	42.3	56.0
	Cg	50-60	0.3	0.5	0.7	0.7	0.3	2.5	63.9	33.6
Ariel: 1/										
S81MS-015-03	Ap	0-5	0.2	0.1	0.3	2.4	1.5	4.5	87.5	8.0
	Bw1	5-15	0.0	0.1	0.5	2.6	1.5	4.7	77.6	17.7
	Bw2	15-29	0.0	0.2	1.0	2.7	1.2	5.1	79.2	15.7
	Bw3	29-40	0.0	0.2	0.7	1.9	1.0	3.8	82.5	13.7
	Eb/B	40-51	0.0	0.2	0.7	2.0	1.4	4.3	85.7	10.0
	Bwxb	51-60	1.2	0.8	1.7	1.8	2.4	7.9	62.9	29.2
Bonn: 1/										
S78MS-015-01	Ap	0-7	---	---	---	---	---	6.9	76.0	17.1
	E	7-14	---	---	---	---	---	3.3	79.2	17.5
	E/B	14-20	---	---	---	---	---	4.0	75.1	20.9
	B/E	20-34	---	---	---	---	---	3.6	73.4	23.0
	Btg	34-52	---	---	---	---	---	4.1	80.1	15.8
	C	52-65	---	---	---	---	---	2.1	82.4	15.5
Calloway: 1/										
S81MS-015-04	Ap	0-6	0.9	1.0	1.0	1.5	0.7	5.1	84.5	10.4
	B1	6-11	0.5	1.1	0.7	0.8	0.5	3.6	75.4	21.0
	B2	11-15	0.8	1.9	1.0	1.0	0.6	5.3	75.6	19.1
	E/Btx	15-20	0.5	1.1	0.6	0.7	0.7	3.6	90.0	6.4
	Btx1	20-26	0.9	1.8	1.1	1.0	0.7	5.5	77.6	16.9
	Btx2	26-60	0.2	0.8	0.8	0.8	0.5	3.1	78.7	18.2
Dubbs: 1/										
S81MS-015-05	Ap	0-5	0.2	0.2	0.4	6.9	18.4	26.1	61.2	12.7
	Bt1	5-17	0.1	0.2	0.3	2.8	9.6	13.0	67.6	19.4
	Bt2	17-25	0.0	0.2	0.2	0.8	4.5	5.7	72.2	22.1
	Bt3	25-39	0.0	0.1	0.1	0.5	7.9	8.6	73.3	18.1
	BC	39-60	0.0	0.2	0.4	0.8	12.5	13.9	69.2	16.9
Dundee: 1/										
S82MS-015-01	Ap	0-5	0.9	0.5	0.7	2.4	15.3	19.8	57.1	23.1
	A	5-9	0.2	0.7	1.1	1.8	16.0	19.8	54.1	26.1
	Btg1	9-15	0.1	0.3	0.3	1.3	20.8	22.8	43.6	33.6
	Btg2	15-23	0.0	0.2	0.2	1.7	25.4	27.5	42.1	30.4
	BCg	23-32	0.1	0.1	0.2	3.8	33.2	37.4	36.4	26.2
	2Cg1	32-44	0.0	0.3	0.3	0.9	9.6	11.1	57.1	31.8
	2Cg2	44-72	0.1	0.3	0.3	0.4	9.1	10.2	64.9	24.9
Falaya: 1/										
S85MS-015-01	Ap	0-6	1.2	0.7	1.4	2.2	1.6	7.1	86.5	6.4
	C	6-15	0.9	0.9	1.9	2.7	1.8	8.2	85.5	6.3
	Cg	15-28	0.7	0.7	1.5	5.3	1.4	9.6	79.5	10.9
	Eqb	28-40	0.8	0.7	1.1	4.1	1.1	7.8	79.5	12.7
	Bqb	40-54	2.2	1.5	1.7	4.2	1.0	10.6	66.2	23.2
	Btqb	54-65	0.8	1.2	2.2	8.5	2.3	15.0	57.6	27.4

See footnotes at end of table.

TABLE 20.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil series	Horizon	Depth	Particle-size distribution							
			Very coarse sand (2.0-1.0 mm)	Coarse sand (1.0-0.5 mm)	Medium sand (0.5-0.25 mm)	Fine sand (0.25-0.10 mm)	Very fine sand (0.10-0.05 mm)	Total sand (2.0-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)
		In	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct
Memphis: 2/										
S81MS-015-01	A	0-2	1.0	0.5	1.1	1.5	1.6	5.7	82.9	11.4
	E	2-7	0.1	0.2	0.9	1.3	2.1	4.6	82.2	13.2
	Bt1	7-16	0.0	0.1	0.2	0.3	0.6	1.2	70.9	27.9
	Bt2	16-45	0.0	0.1	0.1	0.1	0.5	0.8	75.9	23.3
	C	45-65	0.0	0.0	0.1	0.2	0.3	0.6	78.8	20.6
Natchez: 1/										
S81MS-015-06	A1	0-2	1.2	1.1	3.4	2.5	4.0	12.2	79.5	8.3
	A2	2-6	0.8	0.3	0.6	0.8	2.5	5.0	88.7	6.3
	Bw	6-22	0.3	0.1	0.1	0.1	0.8	1.4	82.0	16.6
	C	22-78	0.5	1.3	0.8	0.4	0.4	3.4	89.0	7.6

1/ Location of this pedon is the same given for the typical pedon described in "Soil Series and Their Morphology."

2/ Memphis silt loam: 1 mile west of Carrollton, NW1/4SE1/4 sec. 13, T. 19 N., R. 3 E.

TABLE 21.--CHEMICAL ANALYSES OF SELECTED SOILS

[Analyses by the Soil Genesis and Morphology Laboratory of the Mississippi Agricultural and Forestry Experiment Station, Mississippi State University]

Soil series	Horizon	Depth	Reaction	Extractable cations				Extractable acidity	Sum of cations	Base saturation
				Ca	Mg	K	Na			
		In	pH	Milliequivalents per 100 grams of soil						Pct
Alligator: 1/ S81MS-015-02	Ap	0-5	4.9	16.9	11.9	1.1	0.7	11.6	42.2	72.4
	Bg1	5-19	4.5	15.5	12.4	0.7	1.0	15.7	45.3	65.4
	Bg2	19-41	4.5	20.3	17.9	0.8	6.2	11.1	56.2	80.3
	Bg	41-50	5.9	22.0	22.9	0.6	6.1	6.5	58.2	88.8
	Cg	50-60	6.5	53.8	21.4	0.6	5.9	1.6	83.3	98.1
Ariel: 1/ 2/ S81MS-015-03	Ap	0-5	5.4	6.9	0.7	0.0	0.4	2.8	10.8	74.2
	Bw1	5-15	4.3	1.8	1.0	0.1	0.6	12.8	16.3	21.9
	Bw2	15-29	4.3	1.6	1.0	0.1	0.6	10.8	14.1	23.4
	Bw3	29-40	4.2	1.2	0.8	0.1	0.5	9.0	11.5	22.4
	Eb/B	40-51	4.3	1.0	0.8	0.1	0.4	8.3	10.6	21.8
	Bwxb	51-60	4.3	1.4	1.2	0.1	0.4	7.4	10.5	29.2
Bonn: 1/ S78MS-015-01	Ap	0-7	4.7	1.0	1.2	0.1	1.4	10.4	14.2	26.5
	E	7-14	4.8	0.2	0.8	0.1	1.7	8.3	11.1	25.1
	E/B	14-20	8.0	1.6	5.2	0.1	5.4	1.7	13.9	87.6
	B/E	20-34	8.2	2.0	6.2	0.1	6.3	1.5	16.0	90.8
	Btg	34-52	8.7	2.3	6.3	0.1	4.7	0.6	14.0	95.7
	C	52-65	8.6	2.5	7.7	0.1	3.9	1.0	15.1	93.5
Calloway: 1/ 3/ S81MS-015-04	Ap	0-6	5.3	7.3	0.7	0.8	0.0	3.2	12.0	73.5
	B1	6-11	4.1	4.2	1.1	0.4	0.3	9.2	15.2	39.6
	B2	11-15	4.2	3.6	1.3	0.2	0.3	9.5	14.8	35.9
	E/Btx	15-20	4.3	1.4	1.2	0.1	0.4	5.1	8.0	36.9
	Btx1	20-26	4.5	1.6	3.1	0.4	0.9	8.4	14.3	41.4
	Btx2	26-60	4.6	1.8	5.1	0.3	5.4	8.4	20.9	60.1
Dubbs: 1/ 4/ S81MS-015-05	Ap	0-5	4.5	7.4	1.7	0.4	0.2	4.4	14.1	68.9
	Bt1	5-17	4.3	8.5	2.2	0.4	0.4	11.6	23.1	49.8
	Bt2	17-25	4.5	9.4	3.0	0.4	0.7	12.1	25.5	52.6
	Bt3	25-39	4.4	10.1	3.0	0.3	1.9	10.3	25.7	59.8
	BC	39-60	4.7	10.2	3.6	0.3	2.9	6.0	23.1	73.7
Dundee: 1/ S82MS-015-01	Ap	0-5	4.4	3.0	2.4	0.4	0.1	16.6	22.5	26.1
	A	5-9	4.5	3.6	2.3	0.2	0.3	14.1	20.4	30.8
	Btg1	9-15	4.7	4.6	3.6	0.2	0.6	15.0	24.0	37.2
	Btg2	15-23	4.7	5.0	4.4	0.2	0.8	14.0	24.4	42.6
	BCg	23-32	5.3	6.1	5.7	0.3	1.9	18.0	23.3	60.5
	2Cg1	32-44	5.7	10.1	8.6	0.3	2.6	5.4	27.1	79.9
	2Cg2	44-72	7.1	10.2	8.5	0.3	2.8	2.9	24.7	88.3
Falaya: 1/ S85MS-015-01	Ap	0-6	6.5	6.3	1.2	0.4	0.2	4.1	12.2	66.5
	C	6-15	5.5	2.9	0.7	0.1	0.6	4.3	8.6	50.7
	Cg	15-28	4.9	2.1	1.4	0.1	0.9	4.6	9.1	49.5
	Egb	28-40	4.6	1.4	1.5	0.1	1.1	5.6	9.7	42.1
	Bgb	40-54	4.6	2.6	2.9	0.1	1.8	9.2	16.6	44.5
	Btgb	54-65	4.7	5.1	5.7	0.2	2.1	9.4	22.5	58.2
Memphis: 5/ S81MS-015-01	A	0-2	4.8	2.3	1.2	0.3	0.0	7.5	11.3	33.7
	E	2-7	5.0	2.0	1.4	0.2	0.0	5.4	8.9	39.9
	Bt1	7-16	5.0	4.5	3.8	0.2	0.1	7.7	16.4	52.9
	Bt2	16-45	5.3	3.0	3.3	0.2	0.2	10.1	16.7	40.3
	C	45-65	5.3	3.1	3.2	0.2	0.3	8.3	15.1	44.9
Natchez: 1/ 6/ S81MS-015-06	A1	0-2	5.5	3.8	2.3	0.2	0.0	4.6	11.0	58.0
	A2	2-6	4.9	2.9	2.2	0.4	0.0	6.0	11.5	47.4
	Bw	6-22	5.8	9.0	4.4	0.4	0.1	4.8	18.6	74.1
	C	22-78	7.1	12.2	3.4	0.2	0.1	1.0	16.8	94.1

TABLE 21.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

1/ Location of this pedon is the same given for the typical pedon described in "Soil Series and Their Morphology."

2/ Laboratory data from this pedon indicates that the pH in the 5 to 60 inch depth is 4.2 to 4.3. The official series only permits pH as low as 4.5. This difference is considered to be within the allowable range of error of observation, and the soils in the survey area are not considered to be taxadjuncts.

3/ Laboratory data from this pedon indicates that the pH in the B1, B2, and E/Btx horizons is 4.1, 4.2, and 4.3, respectively. The official series only permits pH as low as 4.5 for these horizons. The Btx2 pH measurement was 4.6; the official series only permits pH as low as 5.1. These differences are considered to be within the allowable range of error of observation.

4/ Laboratory data from this pedon indicates that the pH in the Bt1 horizon is 4.3 and the Bt3 horizon is 4.4. The official series only permits pH as low as 4.5. This difference is considered to be within the range of error of observation, and the soils in the survey area are not considered to be taxadjuncts.

5/ Memphis silt loam: 1 mile west of Carrollton, NW1/4SE1/4 sec. 13, T. 19 N., R. 3 E.

6/ Laboratory data from this pedon indicates that the pH in the A2 horizon is 4.9. The official series description only permits pH as low as 5.1 for this horizon. This difference is considered to be within the allowable range of error of observation, and the soils in the survey area are not considered to be taxadjuncts.

TABLE 22.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Adler	Coarse-silty, mixed, nonacid, thermic Aquic Udifluvents
Alligator	Very-fine, montmorillonitic, acid, thermic Vertic Haplaquepts
Ariel	Coarse-silty, mixed, thermic Fluventic Dystrochrepts
Arkabutla	Fine-silty, mixed, acid, thermic Aeric Fluvaquents
Bonn	Fine-silty, mixed, thermic Glossic Natraqualfs
Bruno	Sandy, mixed, thermic Typic Udifluvents
*Calloway	Fine-silty, mixed, thermic Glossaquic Fragiudalfs
Chenneby	Fine-silty, mixed, thermic Fluvaquentic Dystrochrepts
Crevasse	Mixed, thermic Typic Udipsamments
Dubbs	Fine-silty, mixed, thermic Typic Hapludalfs
Dulac	Fine-silty, mixed, thermic Typic Fragiudalfs
Dundee	Fine-silty, mixed, thermic Aeric Ochraqualfs
Falaya	Coarse-silty, mixed, acid, thermic Aeric Fluvaquents
Forestdale	Fine, montmorillonitic, thermic Typic Ochraqualfs
Grenada	Fine-silty, mixed, thermic Glossic Fragiudalfs
Lexington	Fine-silty, mixed, thermic Typic Paleudalfs
Loring	Fine-silty, mixed, thermic Typic Fragiudalfs
Maben	Fine, mixed, thermic Ultic Hapludalfs
Memphis	Fine-silty, mixed, thermic Typic Hapludalfs
Morganfield	Coarse-silty, mixed, nonacid, thermic Typic Udifluvents
Natchez	Coarse-silty, mixed, thermic Typic Eutrochrepts
Oaklimeter	Coarse-silty, mixed, thermic Fluvaquentic Dystrochrepts
Providence	Fine-silty, mixed, thermic Typic Fragiudalfs
Saffell	Loamy-skeletal, siliceous, thermic Typic Hapludults
Sharkey	Very-fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Smithdale	Fine-loamy, siliceous, thermic Typic Hapludults
Tutwiler	Coarse-silty, mixed, thermic Typic Hapludalfs

* The soil is a taxadjunct to the series. See text for the description of those characteristics that are outside the allowable range of the series.

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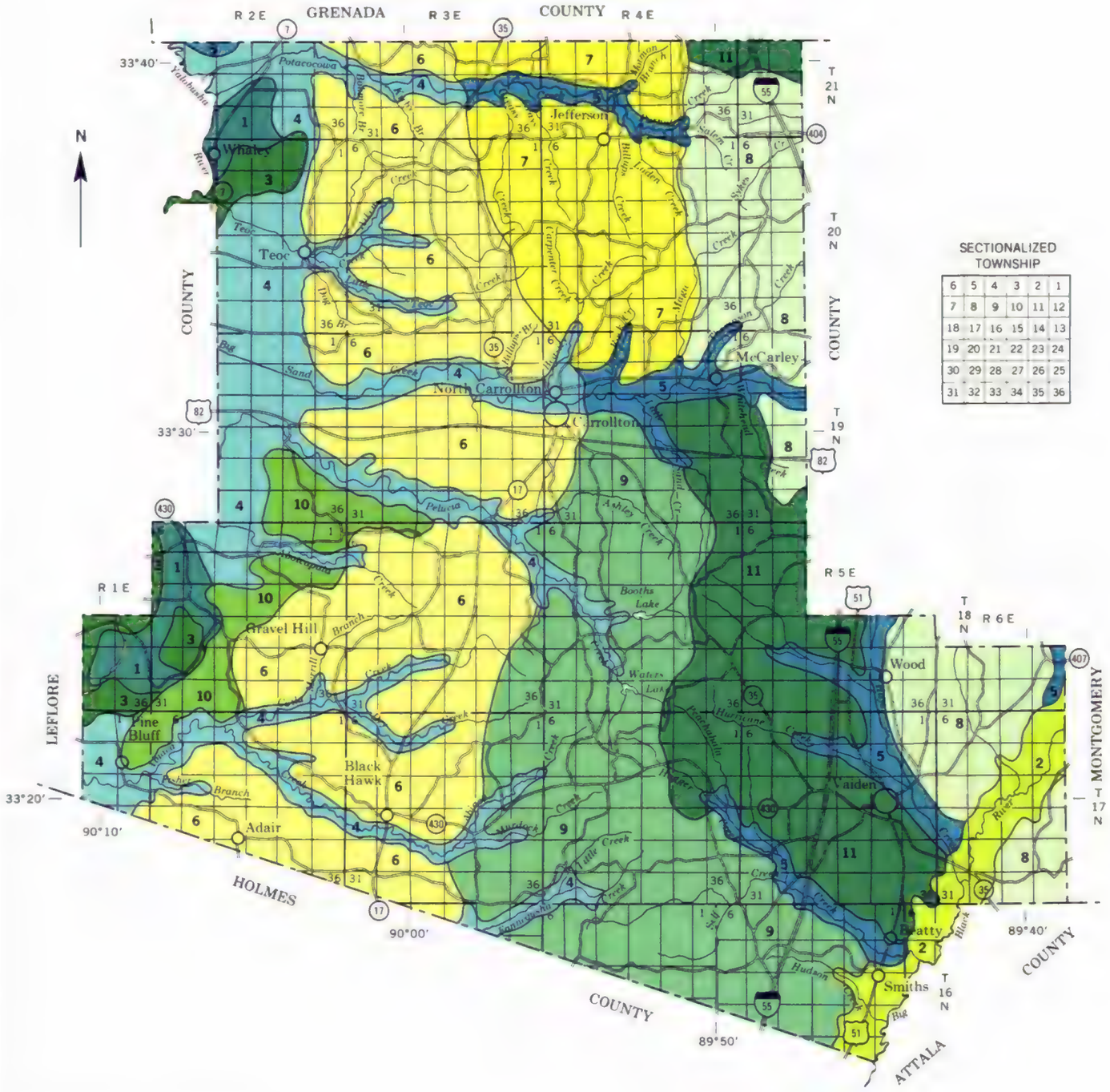


SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

LEGEND*

NEARLY LEVEL TO GENTLY SLOPING, EXCESSIVELY DRAINED TO POORLY DRAINED SOILS; IN DEPRESSIONS AND ON FLOOD PLAINS, NATURAL LEVEES, AND ALLUVIAL FANS AND APRONS

1 — Dundee-Dubbs-Sharkey: Nearly level, somewhat poorly drained, well drained, and poorly drained, silty and clayey soils; on natural levees, flood plains, and in depressions

2 — Chenneby-Arkabutla: Nearly level, somewhat poorly drained, silty soils; on flood plains

3 — Sharkey: Nearly level, poorly drained, clayey soils; in depressional slack water areas and old river runs

4 — Adler-Bruno-Morganfield: Nearly level and gently sloping, moderately well drained, excessively drained, and well drained, silty and loamy soils; on flood plains and alluvial fans and aprons

5 — Oaklimeter-Ariel-Falaya: Nearly level, moderately well drained, well drained, and somewhat poorly drained, silty soils; on flood plains

NEARLY LEVEL TO HILLY, MODERATELY WELL DRAINED AND WELL DRAINED SOILS; ON UPLANDS AND TERRACES

6 — Memphis-Loring-Natchez: Nearly level to hilly, well drained and moderately well drained, silty soils, some of which have a fragipan; on uplands and terraces

7 — Loring-Providence-Smithdale: Gently sloping to steep, moderately well drained and well drained, silty and loamy soils, some of which have a fragipan; on uplands

8 — Smithdale-Providence-Lexington: Sloping to hilly, well drained and moderately well drained, loamy and silty soils, some of which have a fragipan; on uplands

9 — Memphis-Smithdale-Providence: Nearly level to hilly, well drained and moderately well drained, silty and loamy soils, some of which have a fragipan; on uplands

10 — Natchez-Memphis-Saffell: Nearly level to hilly, well drained, silty and loamy soils, some of which have gravel in the subsoil; on uplands and terraces

11 — Providence-Loring: Sloping to steep, moderately well drained, silty soils that have a fragipan; on uplands

*The texture given in the descriptive heading refers to the texture of the surface layer of the major soils in each map unit.

COMPILED 1987

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
MISSISSIPPI AGRICULTURAL AND FORESTRY EXPERIMENT STATION

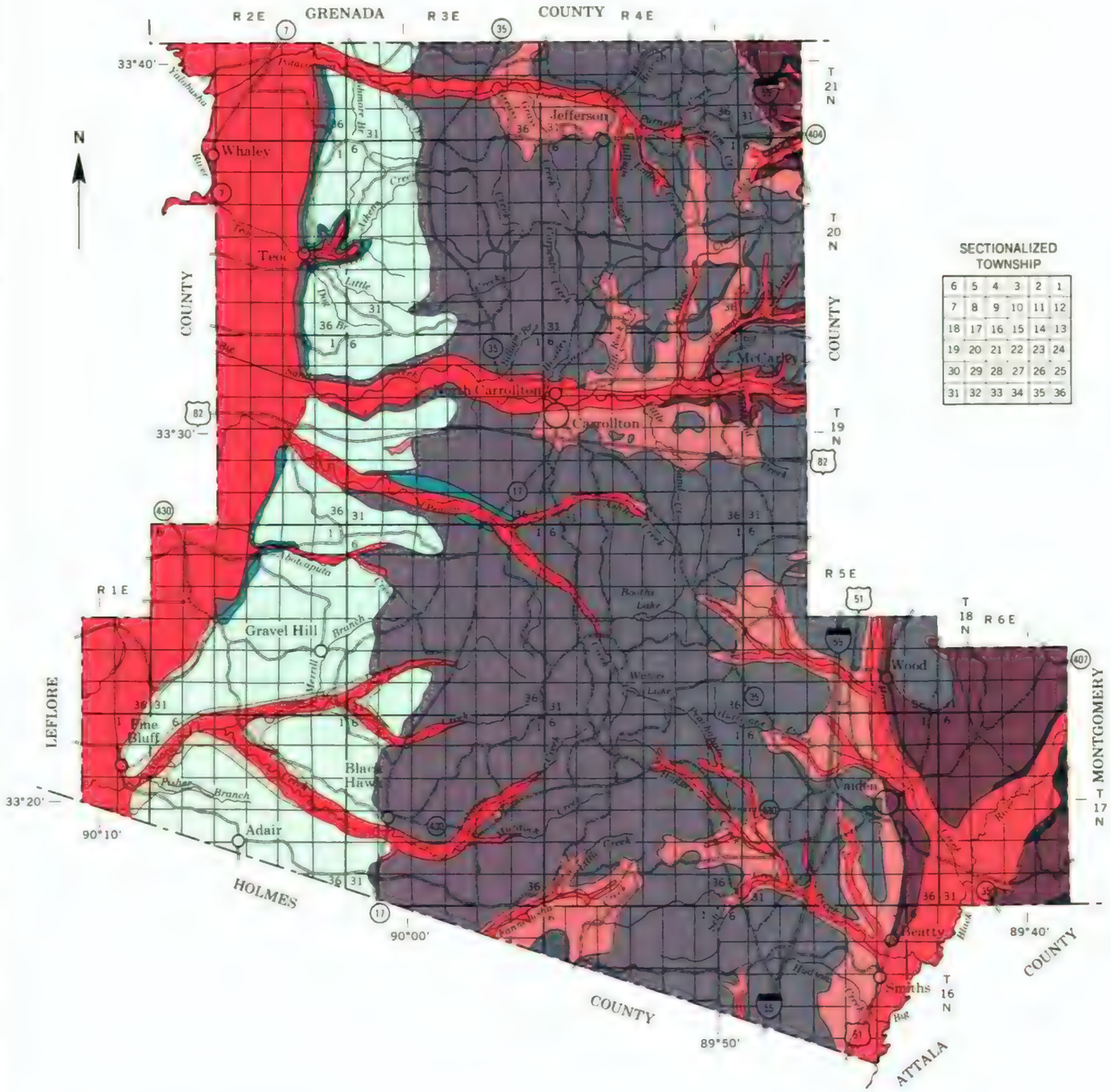
GENERAL SOIL MAP

CARROLL COUNTY, MISSISSIPPI

Scale 1:253,440

1 0 1 2 3 4 Mi

1 0 4 8 Km



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

LEGEND

HOLOCENE

- Alluvium

PLEISTOCENE

- Loess
- Pre-loess fluvial deposits

EOCENE

- Shipps Creek Shale Member of the Cook Mountain Formation
- Kosciusko Formation
- Zilpha Formation
- Winona Formation
- Basic City Member of the Tallahatta Formation

MAPPED 1950
REVISED 1987

SOURCE: Geologic Map of Carroll County, MS by Franklin Earl Vestal, revised by Michael C. Seal, Bureau of Geology.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
MISSISSIPPI AGRICULTURAL AND FORESTRY EXPERIMENT STATION

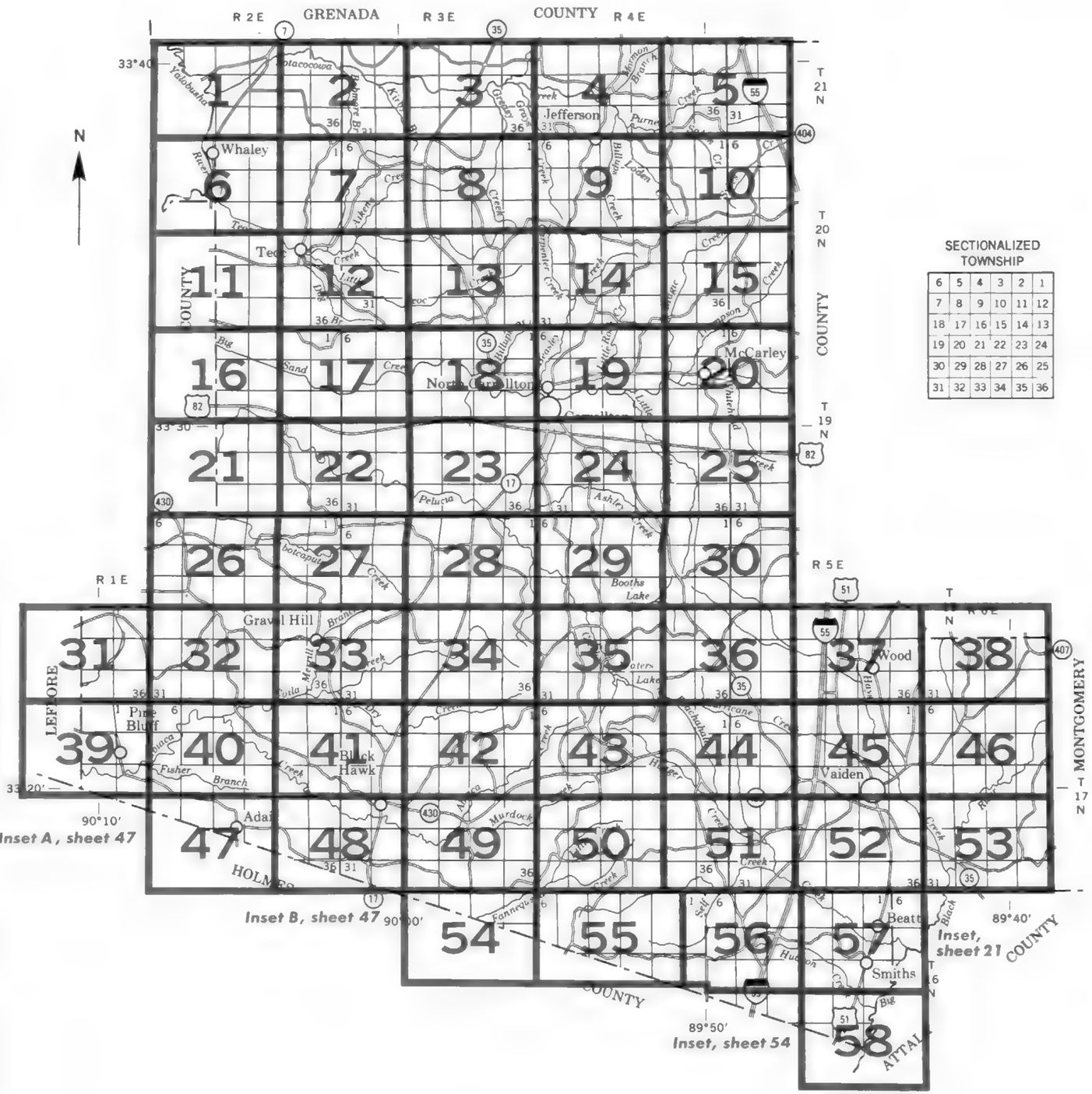
GENERAL GEOLOGY MAP

CARROLL COUNTY, MISSISSIPPI

Scale 1:253,440

1 0 1 2 3 4 Mi

1 0 4 8 Km



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Original text from each individual map sheet read:
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

INDEX TO MAP SHEETS

CARROLL COUNTY, MISSISSIPPI

Scale 1:253,440

1 0 1 2 3 4 Mi

1 0 4 8 Km

SOIL LEGEND

Symbols consist of numbers or a combination of numbers and letters and represent the kind of soil. In some units the number is followed by a capital letter: A, B, C, D, E or F which represents the slope. Symbols without a slope letter are nearly level soils or include miscellaneous areas. A final number of 2 or 3 indicates the soil is eroded or severely eroded, respectively.

Soil names followed by the adscript 1/ are order 3 map units. These units are mapped at a lower intensity and in larger delineations, but mapping has been controlled well enough to be interpreted for the expected use of the soils.

(Alphabetical Listing)

SYMBOL	NAME
210	Adler silt loam
21	Adler silt loam, occasionally flooded
20	Alligator silty clay
28	Ariel silt, occasionally flooded
22	Arkabutla silt loam, frequently flooded
80	Bonn silt loam, occasionally flooded
13	Bruno sandy loam, occasionally flooded
19	Bruno-Tutwiler complex
1A	Calloway silt loam, 0 to 1 percent slopes
23	Chenneby silt loam, frequently flooded
17	Chenneby-Arkabutla association, frequently flooded 1/
72	Crevasse sand, occasionally flooded
2A	Dubbs silt loam, 0 to 2 percent slopes
3C3	Dulac silt loam, 5 to 8 percent slopes, severely eroded
3D3	Dulac silt loam, 8 to 12 percent slopes, severely eroded
3A	Dundee silt loam, 0 to 2 percent slopes
43	Falaya silt, occasionally flooded
24	Forestdale silt loam
4A	Grenada silt loam, 0 to 1 percent slopes
4B	Grenada silt loam, 1 to 3 percent slopes
46	Gullied land - Loring complex
48	Gullied land - Smithdale complex
5B2	Loring silt loam, 2 to 5 percent slopes, eroded
5C2	Loring silt loam, 5 to 8 percent slopes, eroded
5C3	Loring silt loam, 5 to 8 percent slopes, severely eroded
5D3	Loring silt loam, 8 to 12 percent slopes, severely eroded
34E	Loring-Memphis association, rolling 1/
14E	Maben-Memphis complex, 8 to 20 percent slopes
6A	Memphis silt loam, 0 to 2 percent slopes
6B2	Memphis silt loam, 2 to 5 percent slopes, eroded
6C2	Memphis silt loam, 5 to 8 percent slopes, eroded
6C3	Memphis silt loam, 5 to 8 percent slopes, severely eroded
6D3	Memphis silt loam, 8 to 12 percent slopes, severely eroded
6E3	Memphis silt loam, 12 to 40 percent slopes, severely eroded
6F2	Memphis silt loam, 15 to 40 percent slopes, eroded
7F	Memphis-Natchez association, hilly 1/
250	Morganfield silt loam
25	Morganfield silt loam, occasionally flooded
60F1	Natchez-Saffell association, hilly 1/
26	Oaklimeter silt loam, occasionally flooded
8C3	Providence silt loam, 5 to 8 percent slopes, severely eroded
8D3	Providence silt loam, 8 to 12 percent slopes, severely eroded
27	Sharkey clay, frequently flooded
300	Sharkey clay, ponded
10E2	Smithdale sandy loam, 12 to 30 percent slopes, eroded
9F	Smithdale-Providence-Lexington association, hilly 1/
50	Udorthents, gravelly

(Numerical Listing)

SYMBOL	NAME
1A	Calloway silt loam, 0 to 1 percent slopes
2A	Dubbs silt loam, 0 to 2 percent slopes
3A	Dundee silt loam, 0 to 2 percent slopes
3C3	Dulac silt loam, 5 to 8 percent slopes, severely eroded
3D3	Dulac silt loam, 8 to 12 percent slopes, severely eroded
4A	Grenada silt loam, 0 to 1 percent slopes
4B	Grenada silt loam, 1 to 3 percent slopes
5B2	Loring silt loam, 2 to 5 percent slopes, eroded
5C2	Loring silt loam, 5 to 8 percent slopes, eroded
5C3	Loring silt loam, 5 to 8 percent slopes, severely eroded
5D3	Loring silt loam, 8 to 12 percent slopes, severely eroded
6A	Memphis silt loam, 0 to 2 percent slopes
6B2	Memphis silt loam, 2 to 5 percent slopes, eroded
6C2	Memphis silt loam, 5 to 8 percent slopes, eroded
6C3	Memphis silt loam, 5 to 8 percent slopes, severely eroded
6D3	Memphis silt loam, 8 to 12 percent slopes, severely eroded
6E3	Memphis silt loam, 12 to 40 percent slopes, severely eroded
6F2	Memphis silt loam, 15 to 40 percent slopes, eroded
7F	Memphis-Natchez association, hilly 1/
8C3	Providence silt loam, 5 to 8 percent slopes, severely eroded
8D3	Providence silt loam, 8 to 12 percent slopes, severely eroded
9F	Smithdale-Providence-Lexington association, hilly 1/
10E2	Smithdale sandy loam, 12 to 30 percent slopes, eroded
13	Bruno sandy loam, occasionally flooded
14E	Maben-Memphis complex, 8 to 20 percent slopes
17	Chenneby-Arkabutla association, frequently flooded 1/
19	Bruno-Tutwiler complex
20	Alligator silty clay
21	Adler silt loam, occasionally flooded
22	Arkabutla silt loam, frequently flooded
23	Chenneby silt loam, frequently flooded
24	Forestdale silt loam
25	Morganfield silt loam, occasionally flooded
26	Oaklimeter silt loam, occasionally flooded
27	Sharkey clay, frequently flooded
28	Ariel silt, occasionally flooded
34E	Loring-Memphis association, rolling 1/
43	Falaya silt, occasionally, flooded
46	Gullied land - Loring complex
48	Gullied land - Smithdale complex
50	Udorthents, gravelly
60F1	Natchez-Saffell association, hilly 1/
72	Crevasse sand, occasionally flooded
80	Bonn silt loam, occasionally flooded
210	Adler silt loam
250	Morganfield silt loam
300	Sharkey clay, ponded

1/ Order 3 map units. These units are mapped at a lower intensity and in larger delineations. Map units were designed primarily for woodland management and wildlife habitat management and are adequate for interpretations for these uses.

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline
- AD HOC BOUNDARY (label)
- Small airport, airfield, park, oilfield, cemetery, or flood pool (Swift Airport; FLOOD POOL LINE)
- STATE COORDINATE TICK
- LAND DIVISION CORNER (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate (21)
- Federal (175)
- State (28)
- County, farm or ranch (1233)

- RAILROAD
- POWER TRANSMISSION LINE (normally not shown)
- PIPE LINE (normally not shown)
- FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small (water)

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) (Indian Mound)
- Located object (label) (Tower)
- Tank (label) (Gas)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
- Double-line (label) (CANAL)
- Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial (water; w)
- Intermittent (int; i)

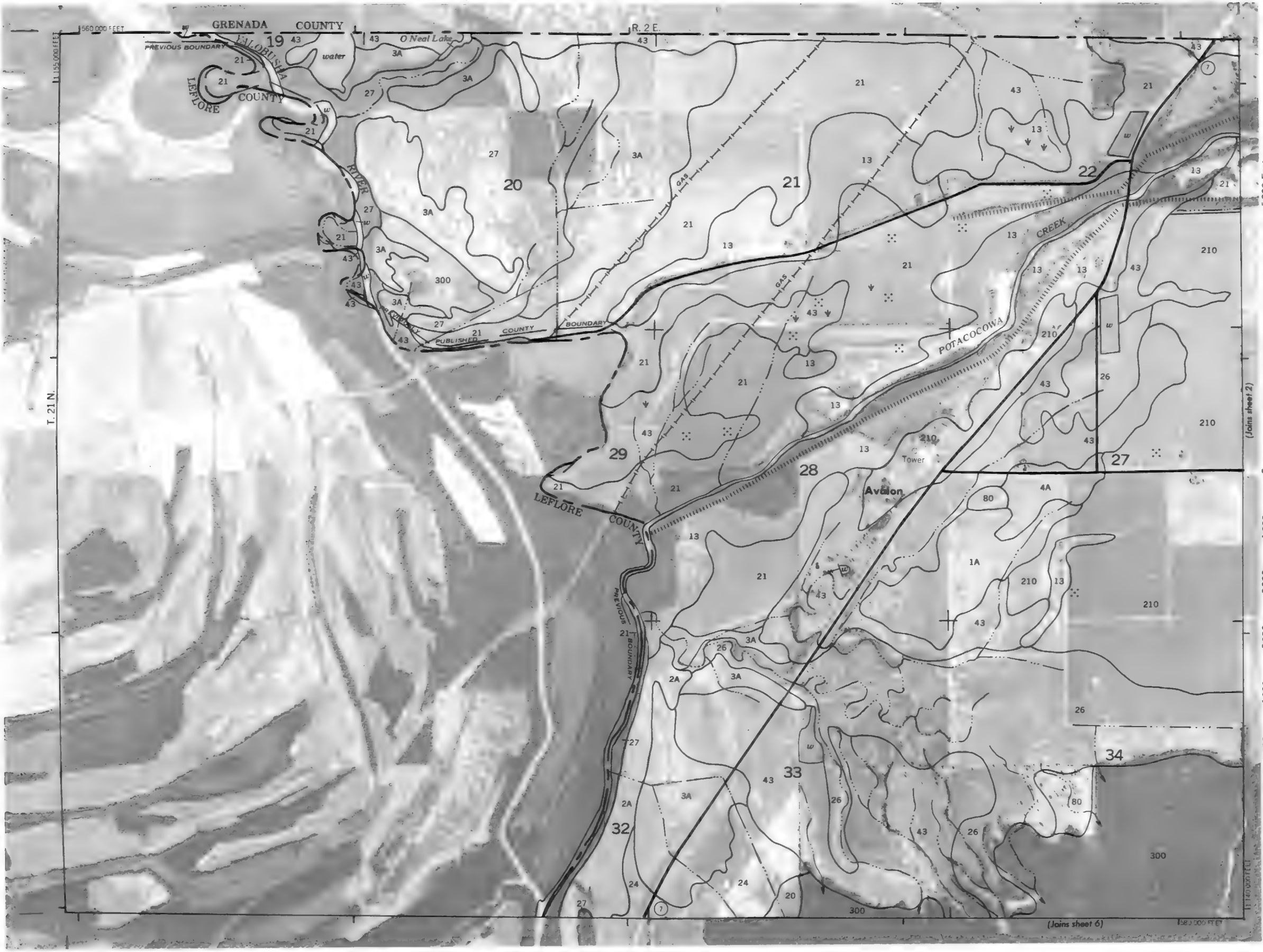
MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

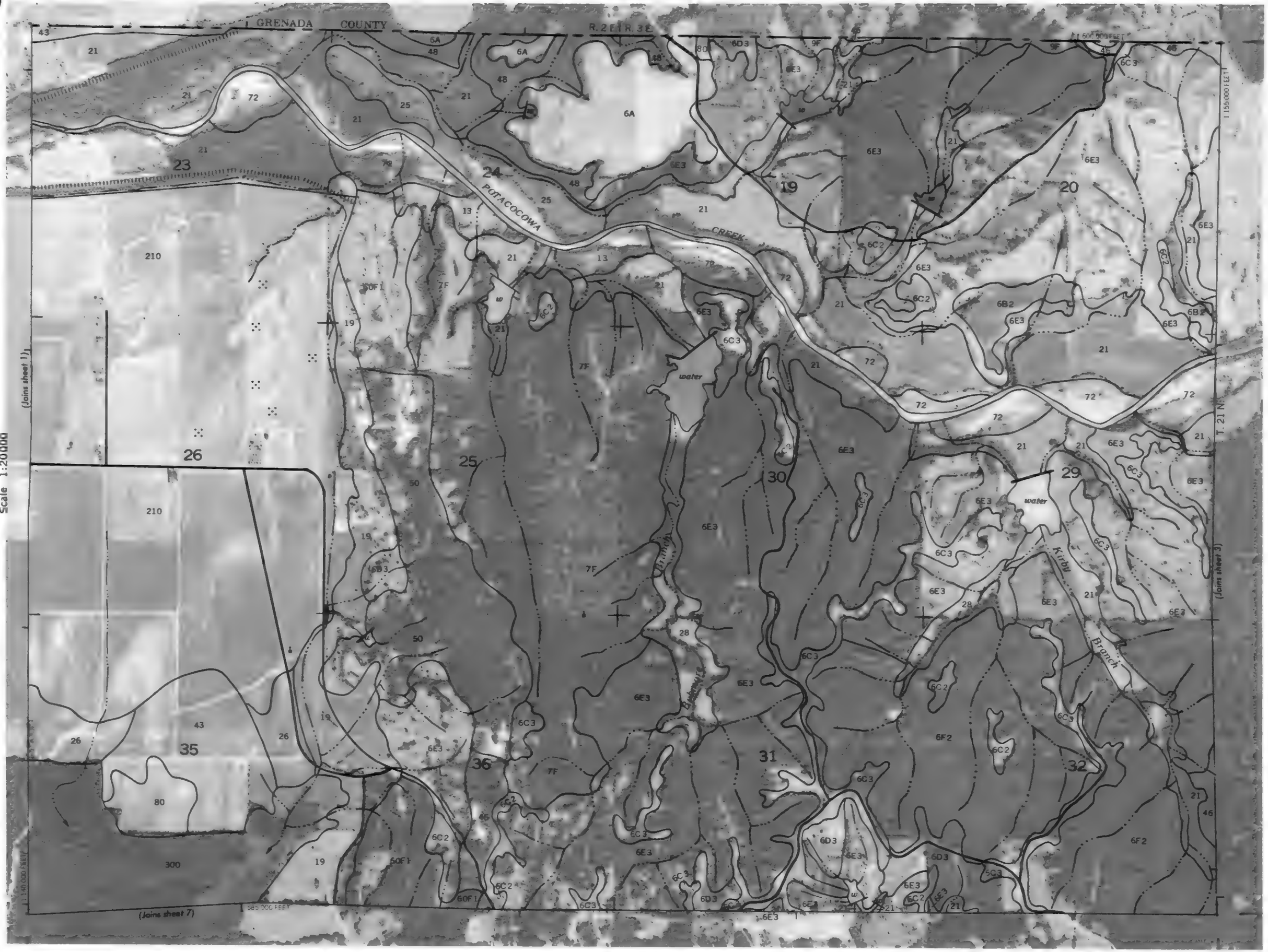
SPECIAL SYMBOLS FOR SOIL SURVEY

- SOIL DELINEATIONS AND SYMBOLS (4A; 5B2)
- ESCARPMENTS
  - Bedrock (points down slope)
  - Other than bedrock (points down slope)
- SHORT STEEP SLOPE
- GULLY
- DEPRESSION OR SINK
- SOIL SAMPLE (normally not shown)
- MISCELLANEOUS
  - Blowout
  - Clay spot
  - Gravelly spot
  - Gumbo, slick or scabby spot (sodic)
  - Dumps and other similar non soil areas
  - Prominent hill or peak
  - Rock outcrop (includes sandstone and shale)
  - Saline spot
  - Sandy spot
  - Severely eroded spot
  - Slide or slip (tips point upslope)
  - Stony spot, very stony spot

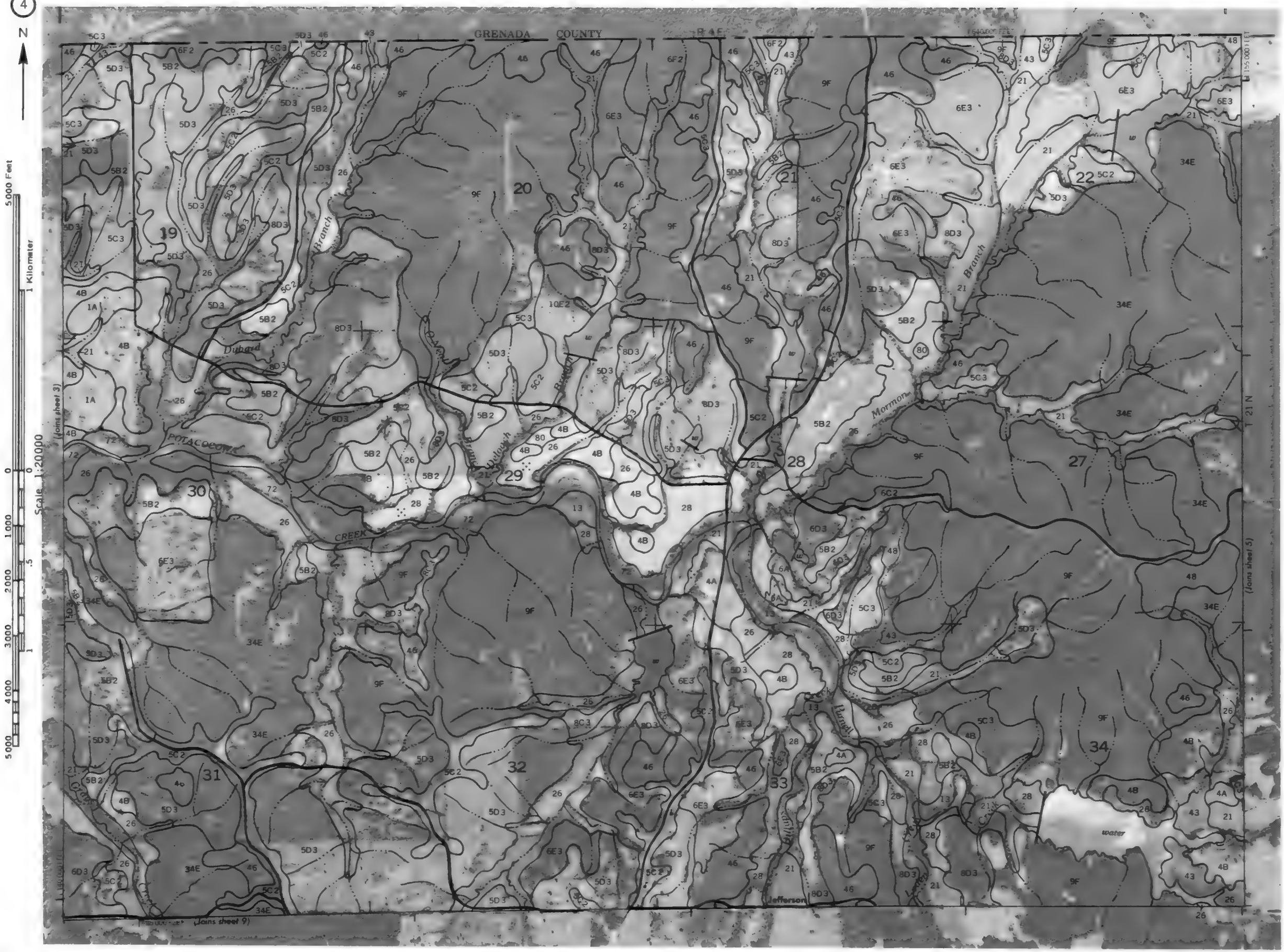
CARROLL COUNTY, MISSISSIPPI — SHEET NUMBER 1



CARROLL COUNTY, MISSISSIPPI — SHEET NUMBER 2




R. 3 E.
GRENADA COUNTY
T. 21 N.
1 155 000 FEET
1 605 000 FEET
21
22
23
24
25
26
27
28
33
34
35
36
water
POTACUCOWA
Greasy
Creek
(Joins sheet 2)
(Joins sheet 4)
(Joins sheet 8)
1 140 000 FEET
5,000 Feet
1 Kilometer
Scale 1:20000


GRENADA COUNTY
R 4 E
T 21 N
Dubard Branch
Beaver Dam Branch
Mormon Branch
POTACOCOWA CREEK
Hurrell Creek
Jefferson
water
(Joins sheet 3)
(Joins sheet 5)
(Joins sheet 9)
5,000 Feet
1 Kilometer
Scale 1:20000

CARROLL COUNTY, MISSISSIPPI — SHEET NUMBER 5

5

N

R. 4 E. | R. 5 E.

GRENADA COUNTY

MONTGOMERY COUNTY

645,000 FEET

1,155,000 FEET

T. 21 N.

(Joins sheet 4)

(Joins sheet 10)

1,145,000 FEET

665,000 FEET

Collins Creek

Gulley Jumping Creek

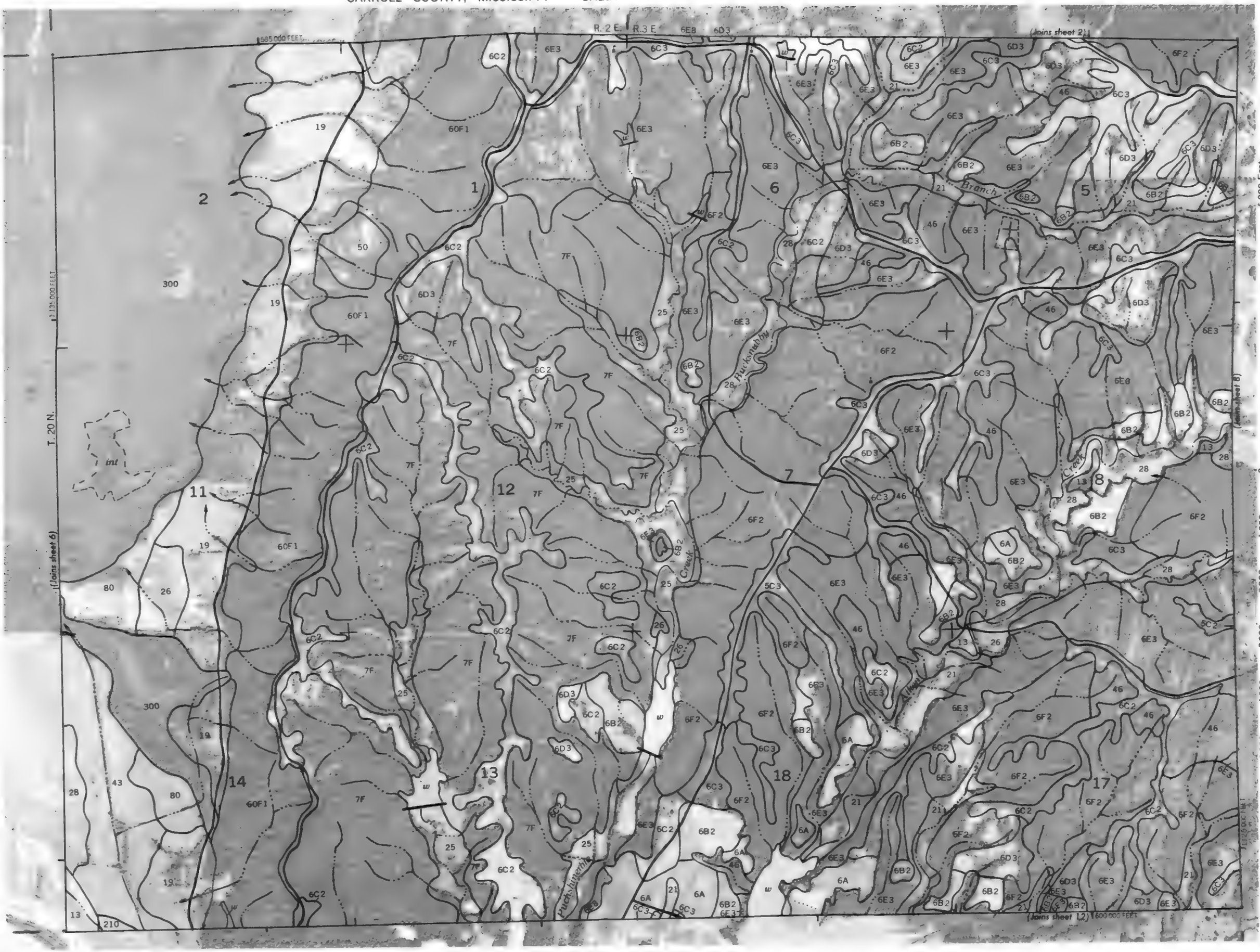
Salem Creek

5000 Feet 1 Kilometer

Scale 1:20000


6
N
5,000 Feet
1 Kilometer
Scale 1:20000
(Joins sheet 1)
R. 2 E.
590 000 FEET
1 135 000 FEET
T. 20 N.
YALOBUSHA RIVER
LEFLORE COUNTY
LEFLORE COUNTY 3A
BOUNDARY
PREVIOUSLY PUBLISHED
Whaley
Lightlime Lake
Trace
Creek
intermittent
(Joins sheet 7)
(Joins sheet 11)
1 135 000 FEET
5 000 FEET

CARROLL COUNTY, MISSISSIPPI — SHEET NUMBER 7



CARROLL COUNTY, MISSISSIPPI — SHEET NUMBER 8

8

N

5,000 Feet

1 Kilometer

Scale 1:20000

R. 3 E.

T. 20 N.

(Joins sheet 3)

(Joins sheet 7)

(Joins sheet 9)

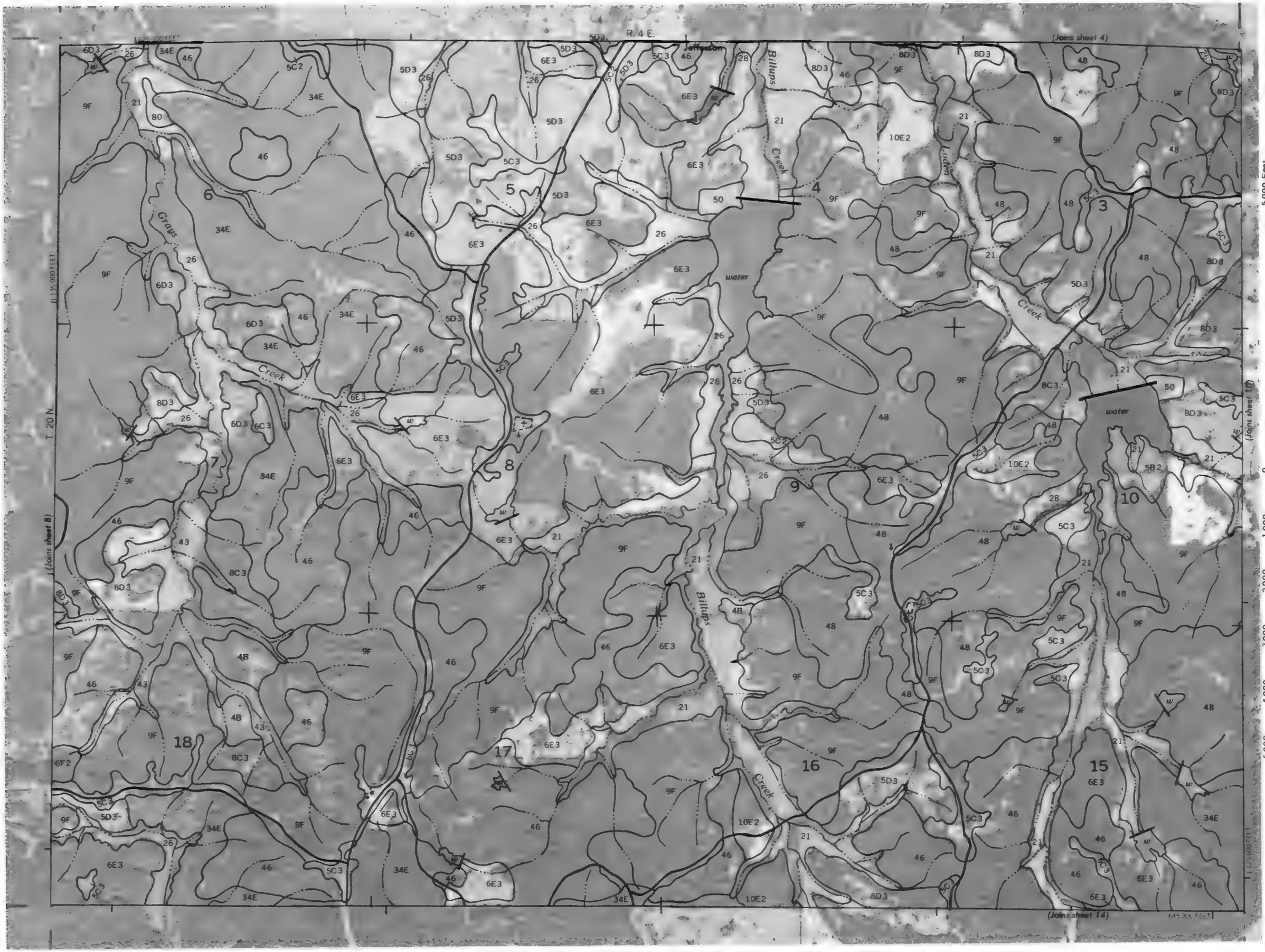
(Joins sheet 13)

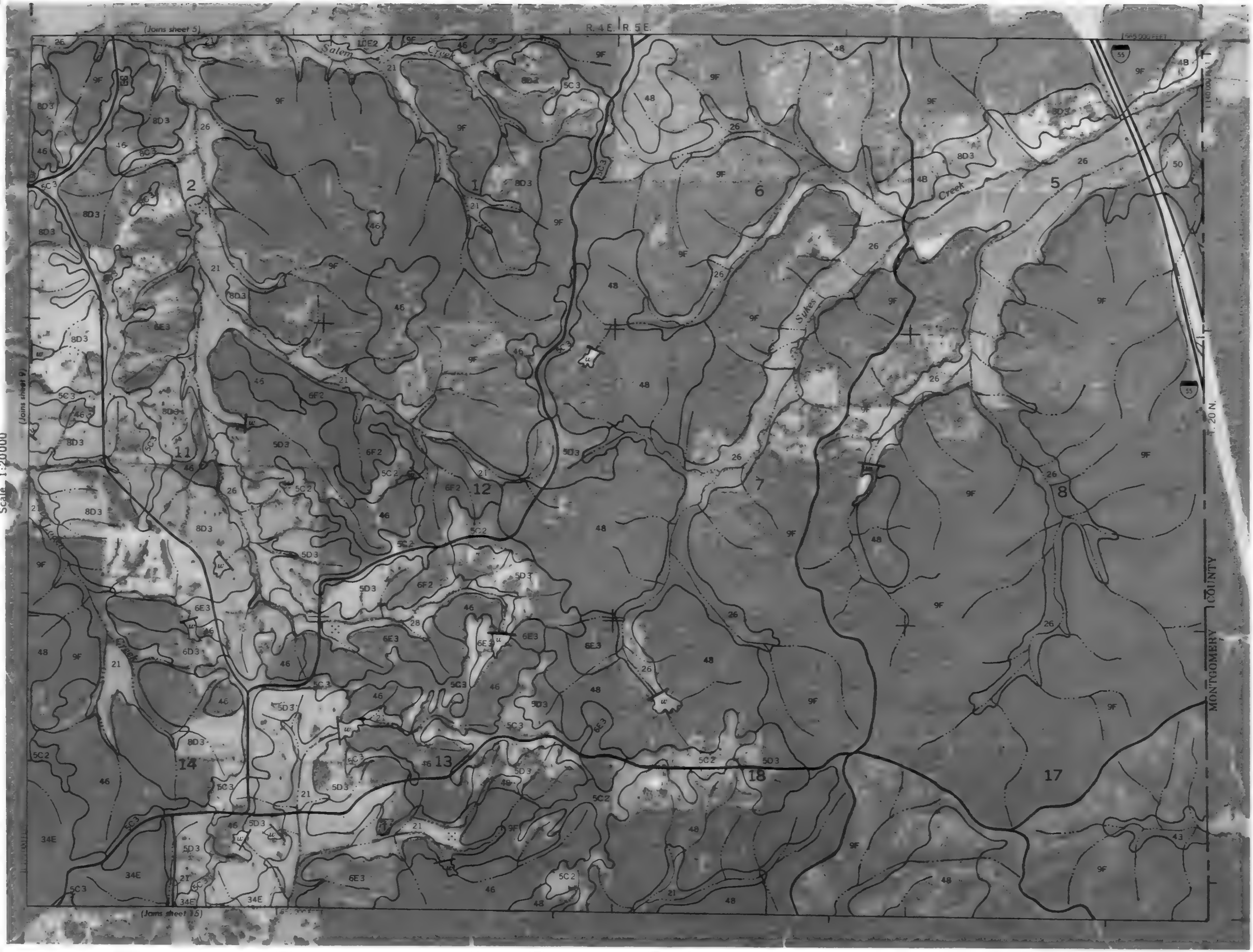
Aiken

Creek

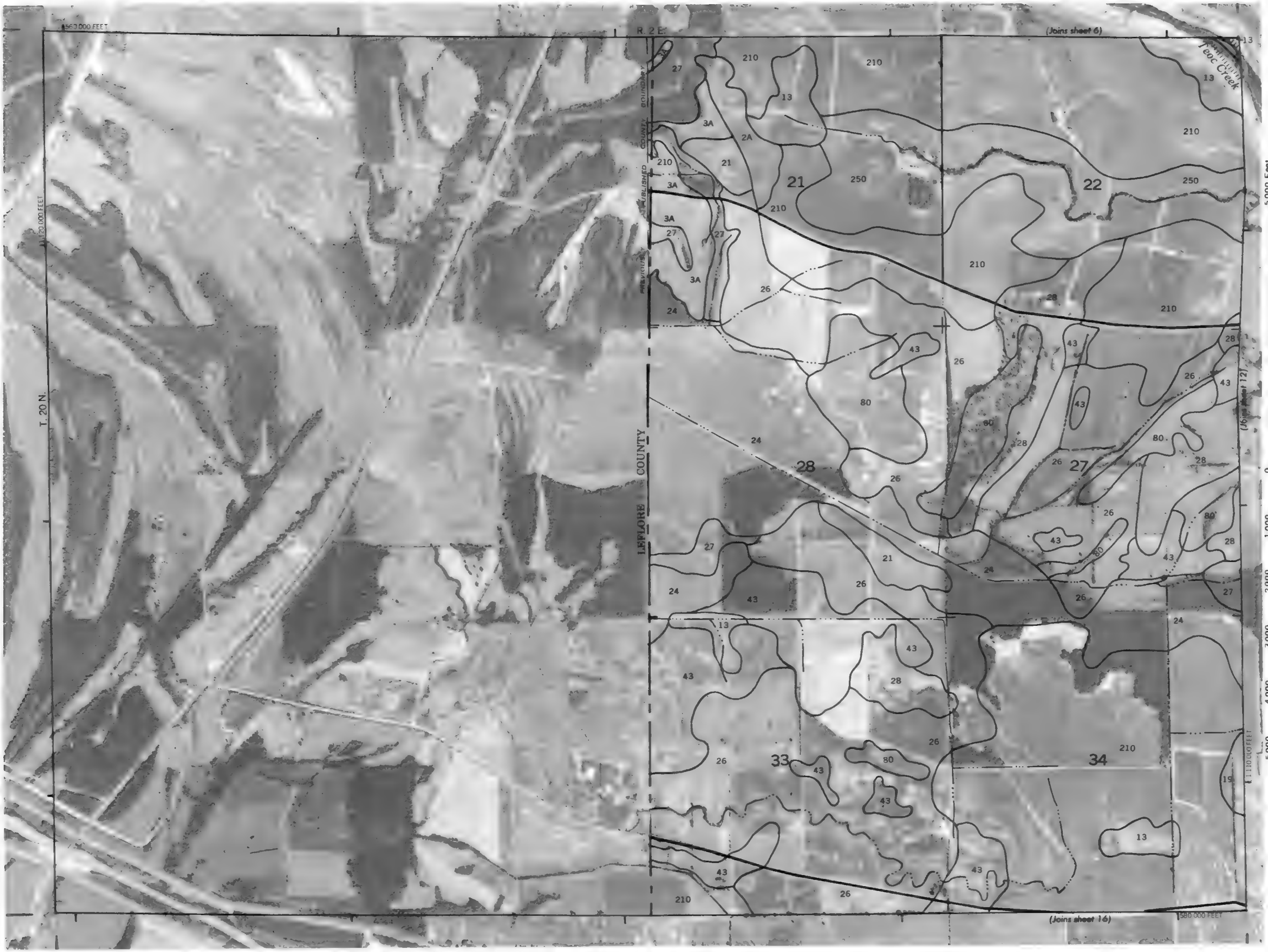
water

CARROLL COUNTY, MISSISSIPPI — SHEET NUMBER 9




10
N
(Joins sheet 5)
R. 4 E.
R. 5 E.
1565000 FEET
Salem
Creek
Sukes
Creek
Creek
(Joins sheet 9)
(Joins sheet 15)
T. 20 N.
MONTGOMERY COUNTY
5,000 Feet
1 Kilometer
Scale 1:20000
0
0
1000
2000
3000
4000
5000
.5
1
1
2
5
6
7
8
11
12
13
14
17
18

CARROLL COUNTY, MISSISSIPPI — SHEET NUMBER 11



12

N

R. 2 E. R. 3 E.

T. 20 N.

(Joins sheet 7)

(Joins sheet 11)

(Joins sheet 13)

(Joins sheet 17)

Scale 1:20000

5,000 Feet

1 Kilometer

1 0 1 .5 0

1000 0 1000 2000 3000 4000 5000 FEET

Teoc Creek

Pyrtashimerbit Creek

Little Teoc Creek

Wagoner Branch

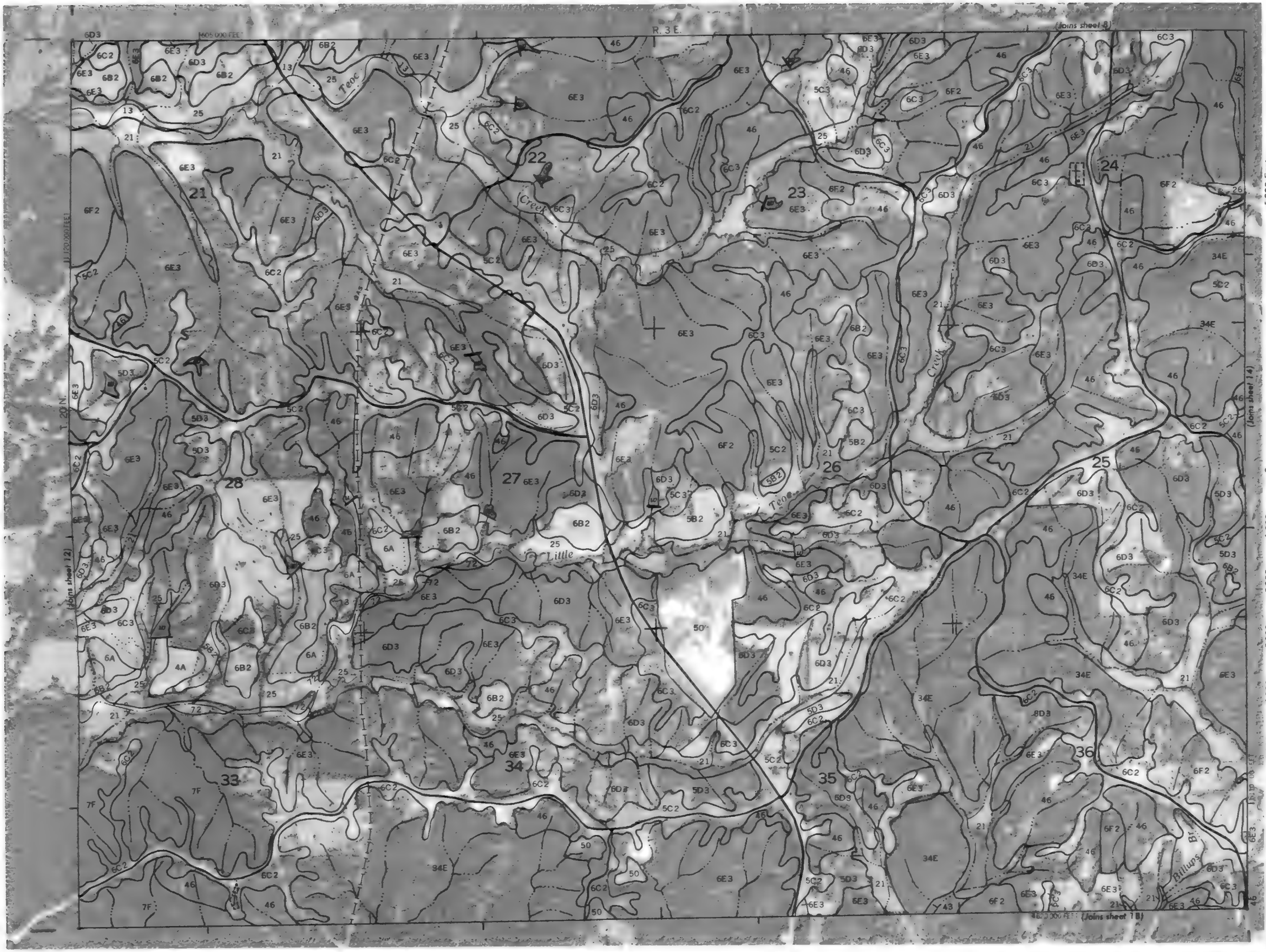
Dog Leg Branch

Teoc Creek

Teoc Creek

Branch

water


13
N
R. 3 E.
T. 20 N.
(Joins sheet 8)
(Joins sheet 12)
(Joins sheet 14)
(Joins sheet 18)
605 000 FEET
1 120 000 FEET
Teoc Creek
Little Teoc Creek
Billups Bi
21
22
23
24
25
26
27
28
33
34
35
36
5000 Feet
1 Kilometer
Scale 1:20000

CARROLL COUNTY, MISSISSIPPI — SHEET NUMBER 14

14

N

5,000 Feet

1 Kilometer

Scale 1:20000

(Joins sheet 9)

(Joins sheet 13)

(Joins sheet 19)

(Joins sheet 15)

R 4 E.

T. 20 N.

19 20 21 22 29 28 27 30 31 32 33 34

Carrington Creek

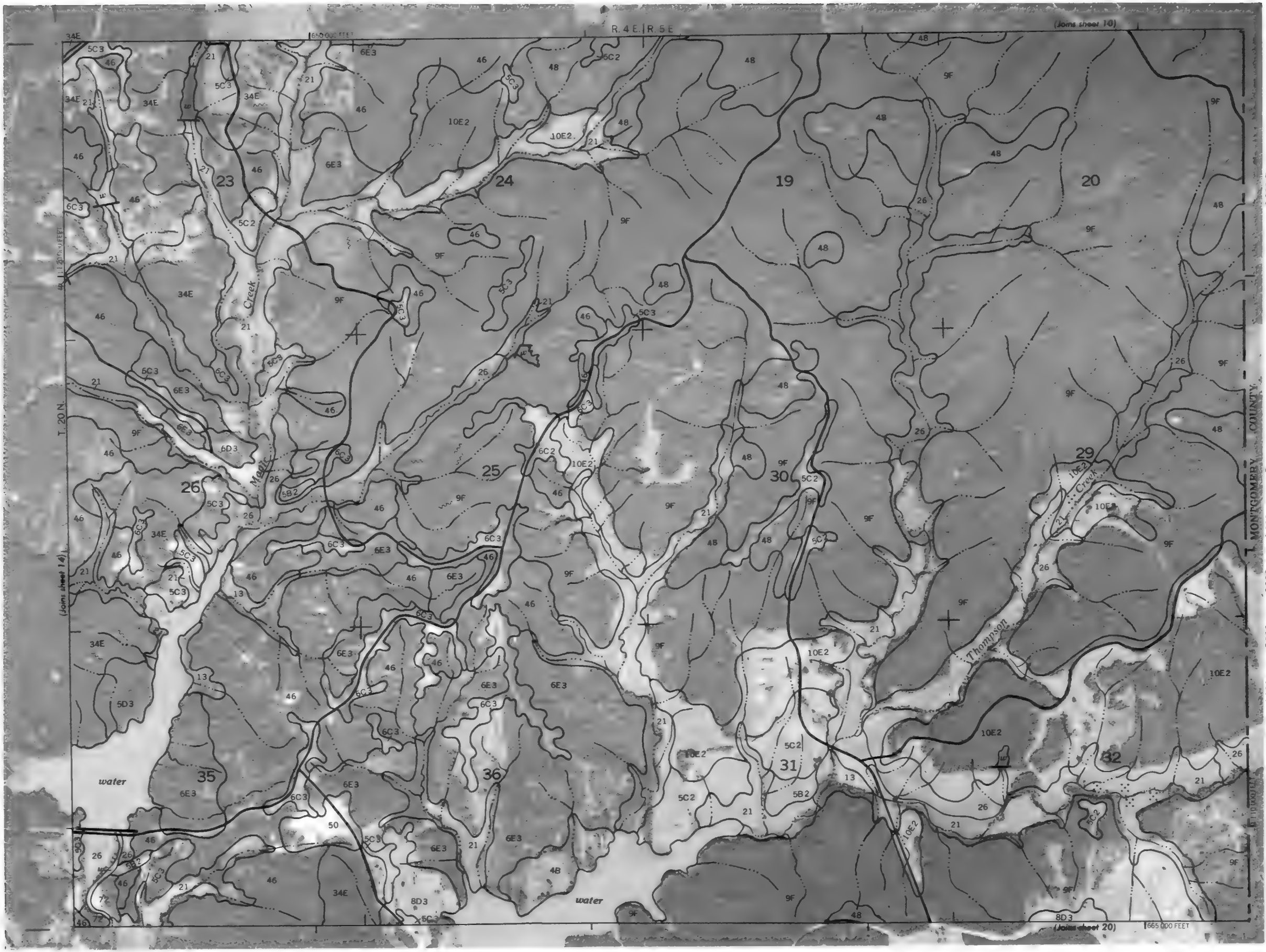
Beasley Creek

Hicks Creek

Den Creek

Creek

water


15
N
R. 4 E.
R. 5 E
(Joins sheet 10)
T. 20 N.
(Joins sheet 14)
(Joins sheet 20)
665 000 FEET
1 120 000 FEET
MONTGOMERY COUNTY
5,000 Feet
1 Kilometer
Scale 1:20000
Creek
Thompson
water
19
20
23
24
25
26
29
30
31
32
35
36

16

N

5,000 Feet

1 Kilometer

Scale 1:20000

R. 2 E. (Joins sheet 11)

13 26 80 43 210 4 3 13 210 13 Big Sand Creek 13 210 9 10 28 26 43 210

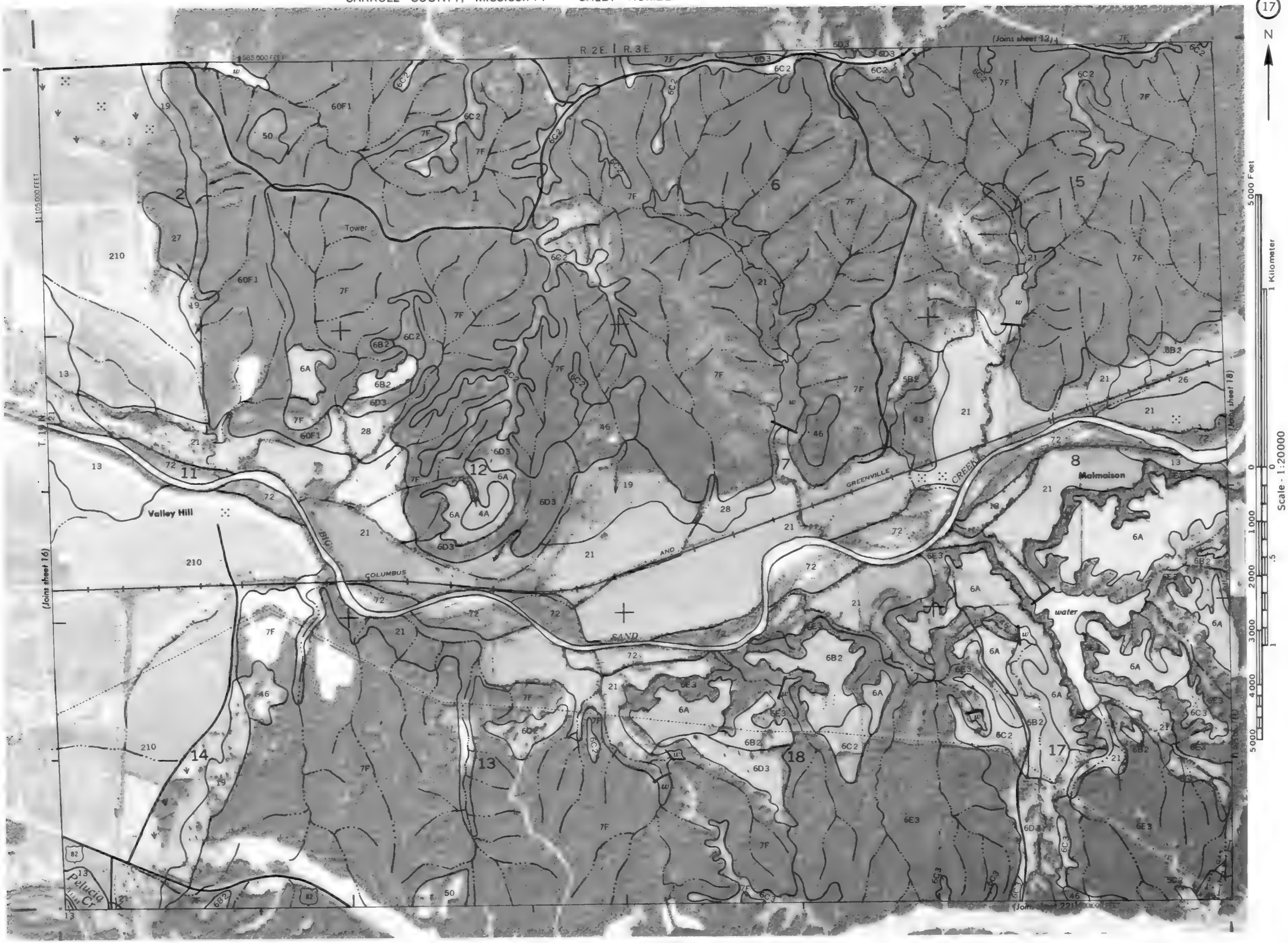
COLUMBUS AND GREENVILLE

LEFLORE COUNTY

210 210 82 16 15 13 210 210 210 13 13 Pelucia Creek 13 210 13

(Joins sheet 17)

(Joins sheet 21)


17
N
R. 2 E.
R. 3 E.
1585 000 FEET
1 105 000 FEET
T. 19
(Joins sheet 12)
(Joins sheet 18)
(Joins sheet 16)
Tower
Valley Hill
Malmaison
water
GREENVILLE
COLUMBUS
AND
SAND
BIG
CREEK
Petucia Cr
5,000 Feet
1 Kilometer
Scale - 1:20000

18

N

R. 3 E.

(Joins sheet 13)

(Joins sheet 17)

(Joins sheet 23)

(Joins sheet 19)

T. 19 N.

5,000 Feet

1 Kilometer

Scale 1:20,000

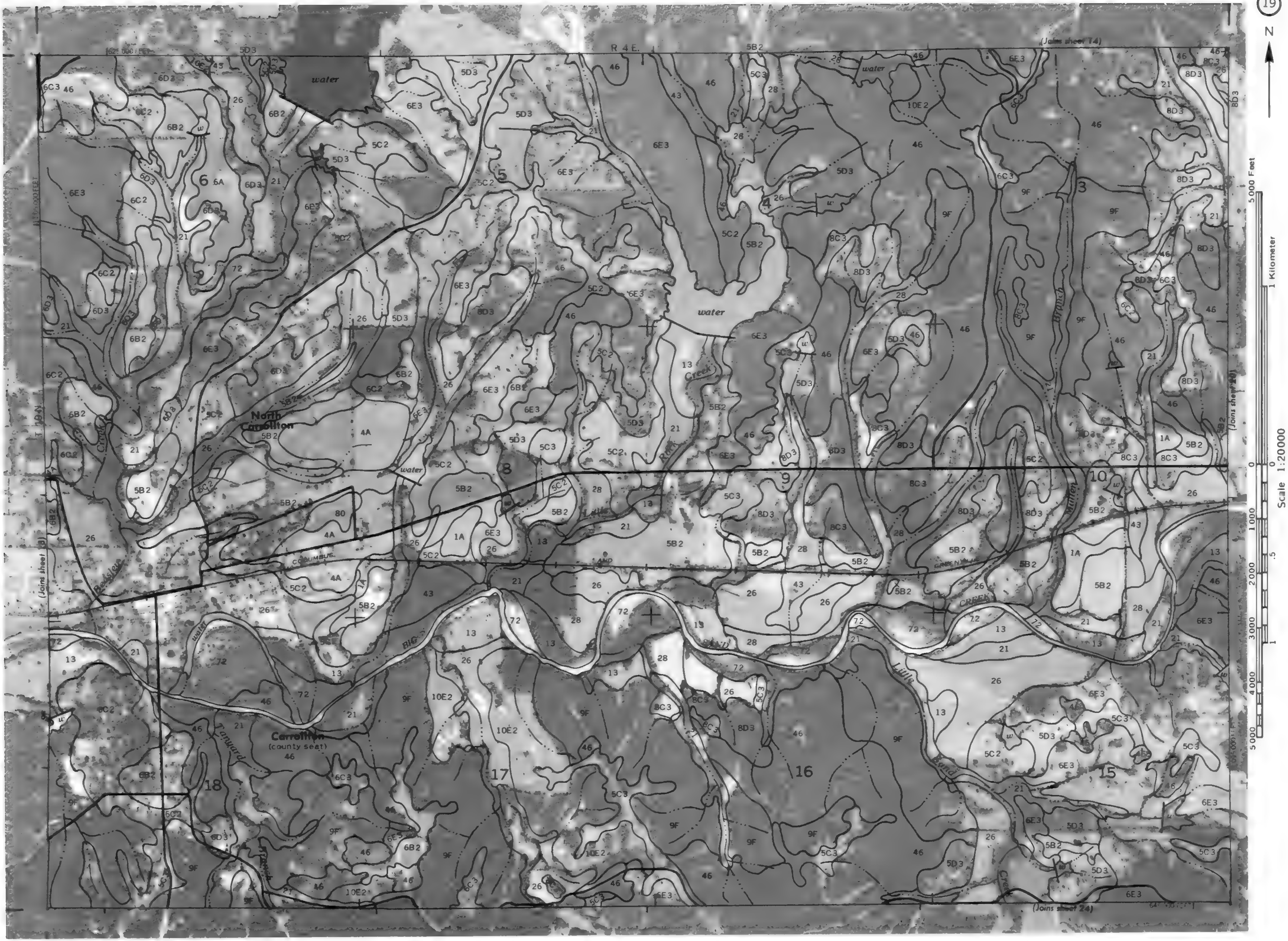
COLUMBUS

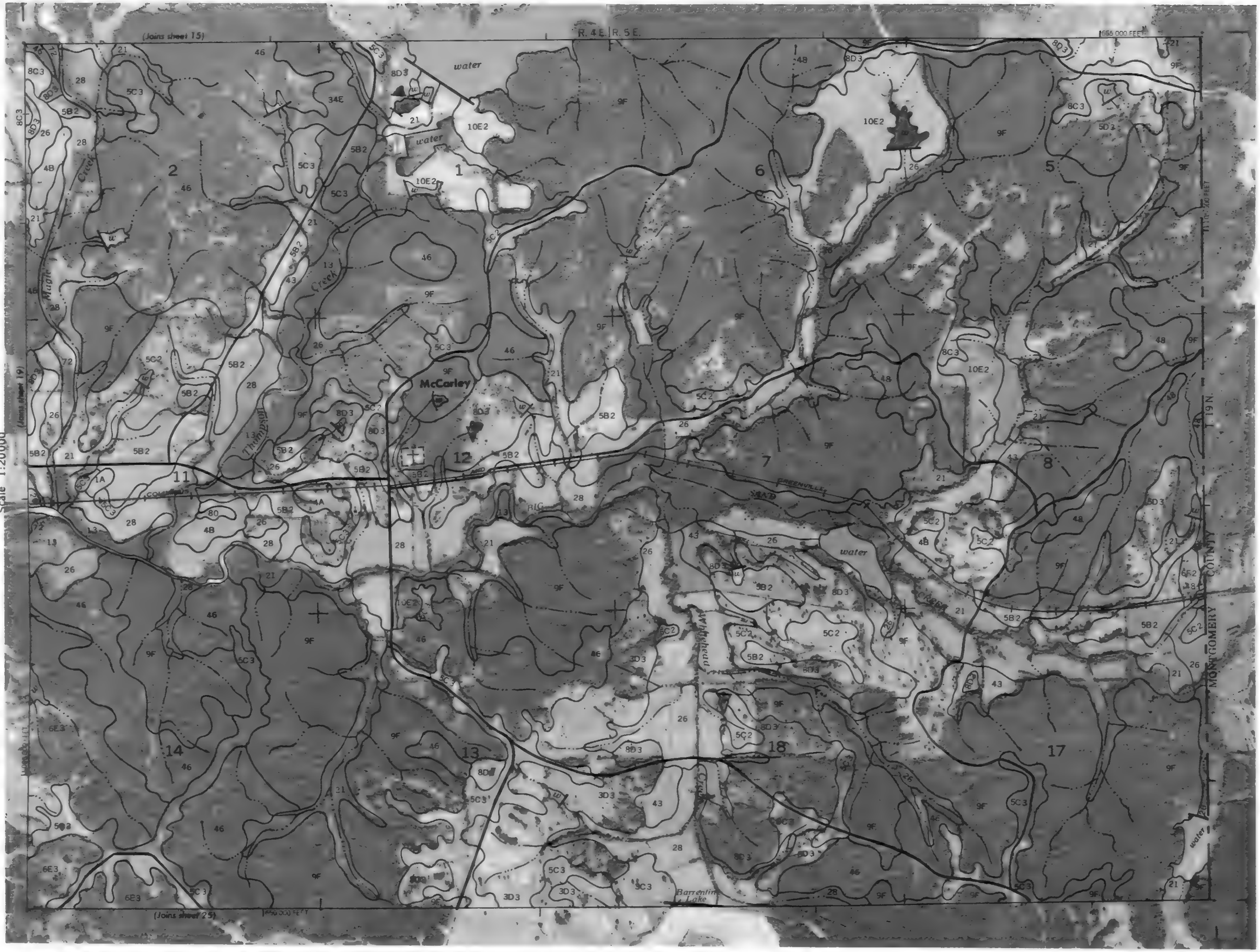
BIG SAND AND Billups Branch

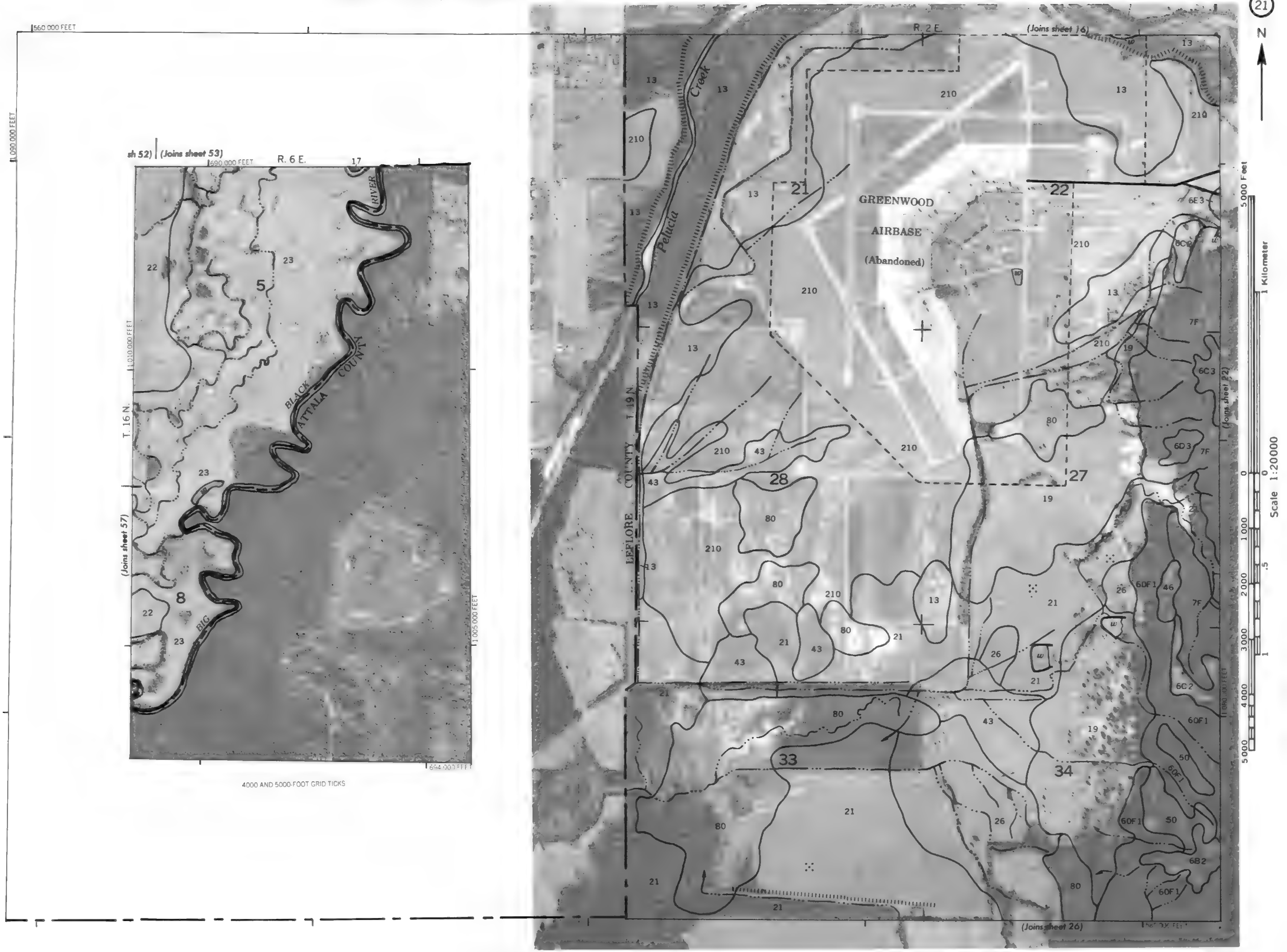
CREEK

GREENVILLE

North Carrollton


19
N
(Joins sheet 14)
(Joins sheet 24)
(Joins sheet 18)
(Joins sheet 20)
R 4 E.
T 19 N
water
North Carrollton
Carrollton
(county seat)
Creek
Big Sand
Little Sand
Branch
Columbus
5 000 Feet
1 Kilometer
Scale 1:20000


20
N
(Joins sheet 15)
R. 4 E.
R. 5 E.
665 000 FEET
T 19 N
MONTGOMERY COUNTY
McCarley
Magee Creek
Thompson Creek
Greenville Road
Barrentine Lake
water
(Joins sheet 19)
(Joins sheet 25)
650 000 FEET
5,000 Feet
1 Kilometer
Scale 1:20000


21
N
560 000 FEET
1 090 000 FEET
R. 2 E.
(Joins sheet 16)
(Joins sheet 26)
(Joins sheet 22)
sh 52)
(Joins sheet 53)
(Joins sheet 57)
690 000 FEET
694 000 FEET
1 010 000 FEET
1 005 000 FEET
R. 6 E.
T. 16 N.
T. 19 N.
4000 AND 5000-FOOT GRID TICKS
GREENWOOD
AIRBASE
(Abandoned)
Pelucia
Creek
LEFLORE COUNTY
ATTALA COUNTY
BLACK
BIG
RIVER
5 000 Feet
1 Kilometer
Scale 1:20000
21
22
27
28
33
34
5
8
17
13
210
43
80
19
21
26
46
50
6E3
6C2
6C3
6D3
6F1
6B2
7F
22
23
w

22

N

R.2E R.3E

T.19N

Pelucia Creek

water

Scale 1:20000

1 Kilometer

5000 Feet

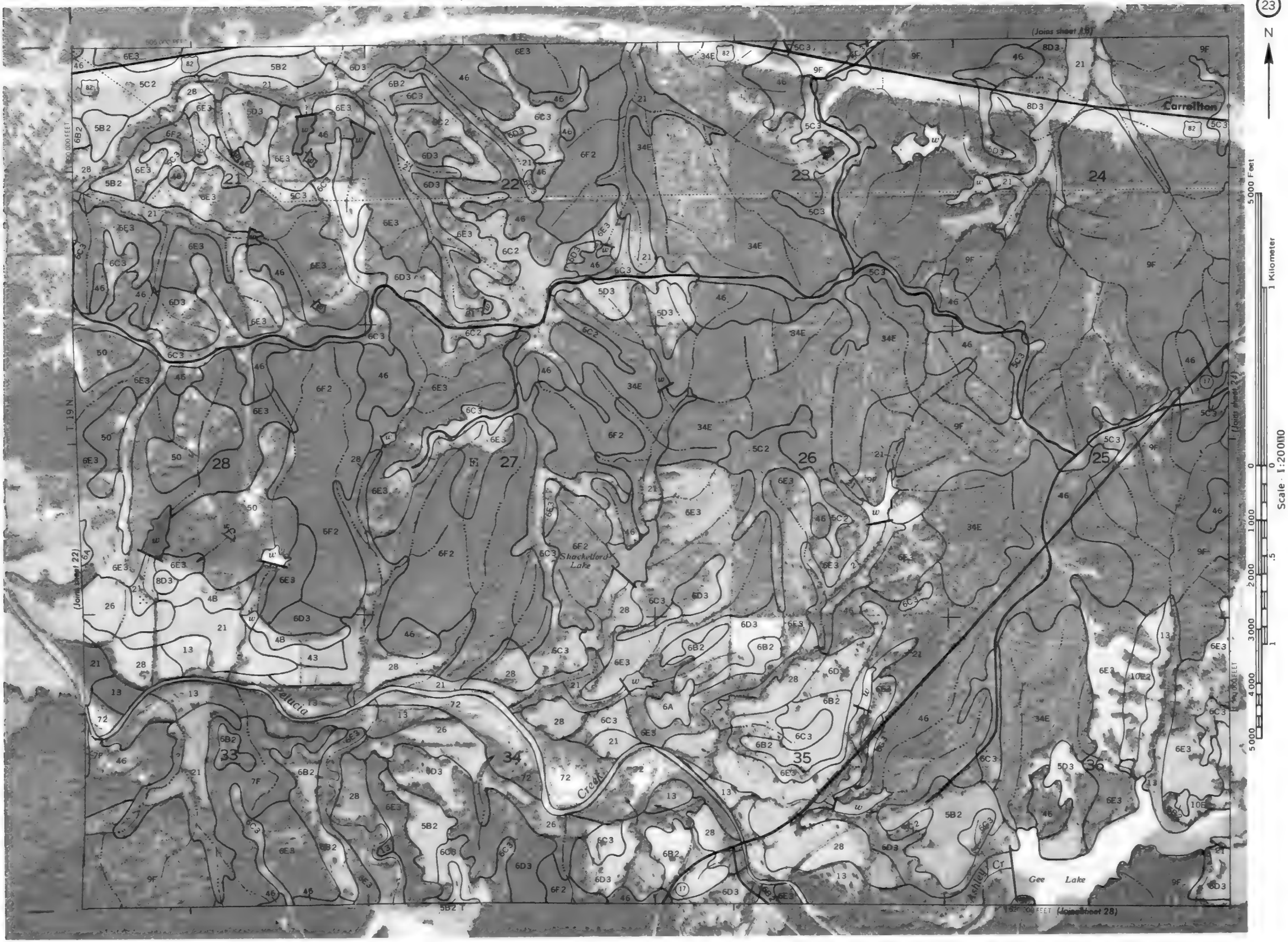
(Joins sheet 17)

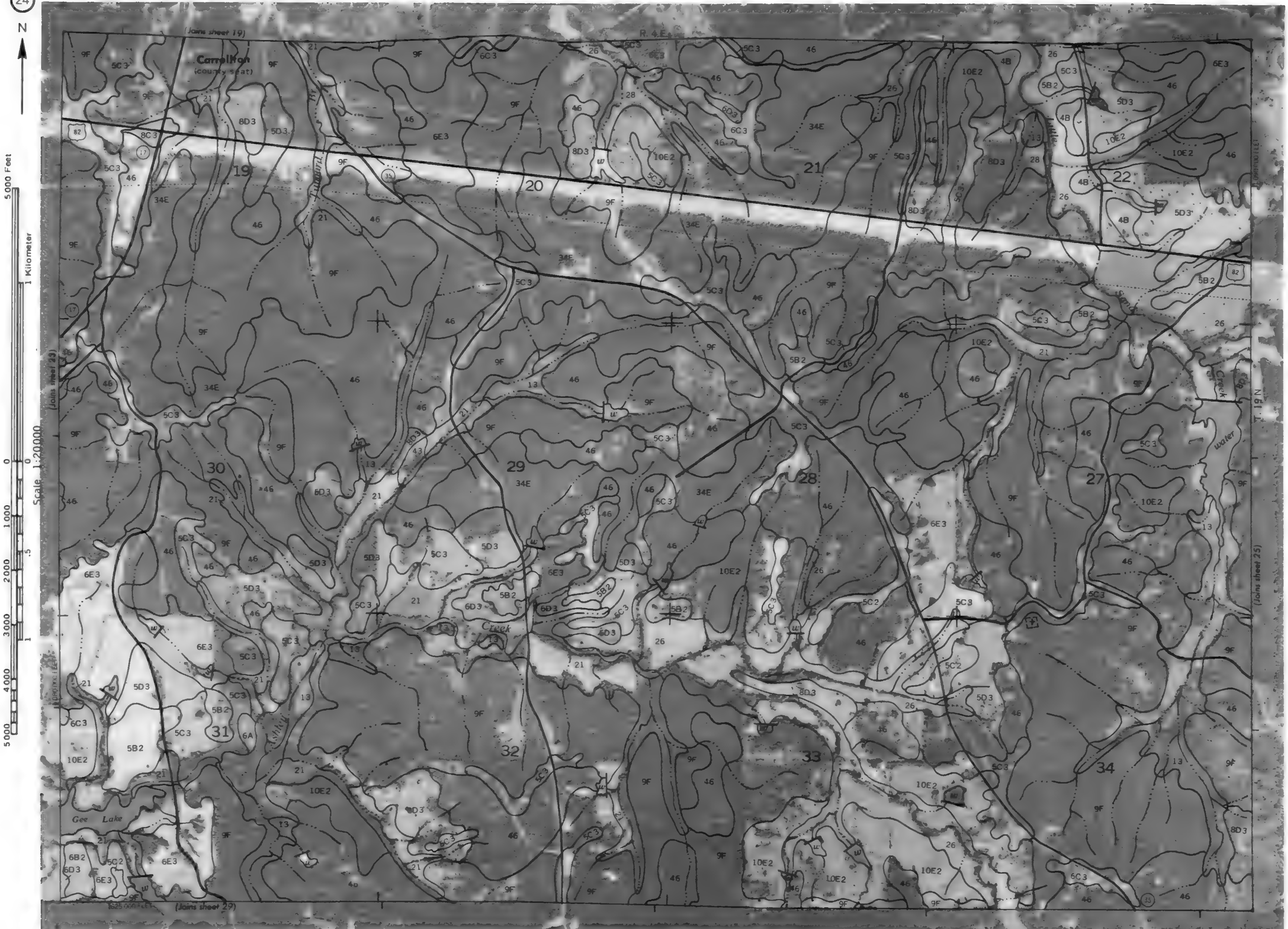
(Joins sheet 21)

(Joins sheet 23)

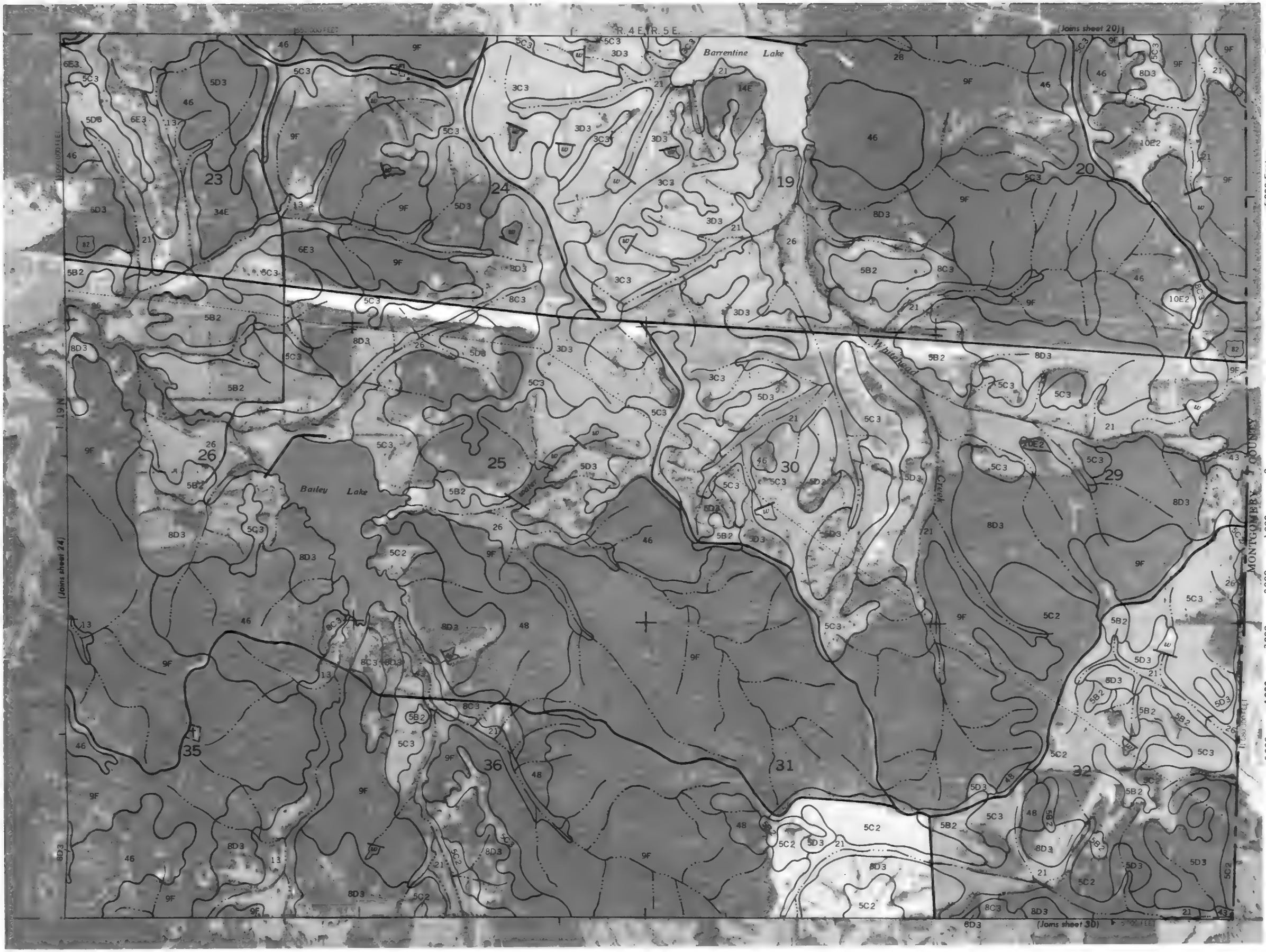
(Joins sheet 27)

CARROLL COUNTY, MISSISSIPPI — SHEET NUMBER 23




N
5 000 Feet
1 Kilometer
Scale 1:20000
(Joins sheet 19)
R. 4 E.
Carrollton
(county seat)
(Joins sheet 23)
(Joins sheet 25)
(Joins sheet 29)
T. 19 N.
Gee Lake
Creek
water
19
20
21
22
27
28
29
30
31
32
33
34
9F
5C3
46
34E
8D3
6C3
10E2
4B
5B2
5D3
6E3
13
21
26
28
6A
5C2
6B2
6D3
8C3

CARROLL COUNTY, MISSISSIPPI — SHEET NUMBER 25



CARROLL COUNTY, MISSISSIPPI — SHEET NUMBER 26

26

N

LEFLORE COUNTY

R 2 E.

(Joins sheet 21)

Abiscapula Creek

T. 18 N.

(Joins sheet 27)

5,000 Feet

1 Kilometer

Scale 1:20000

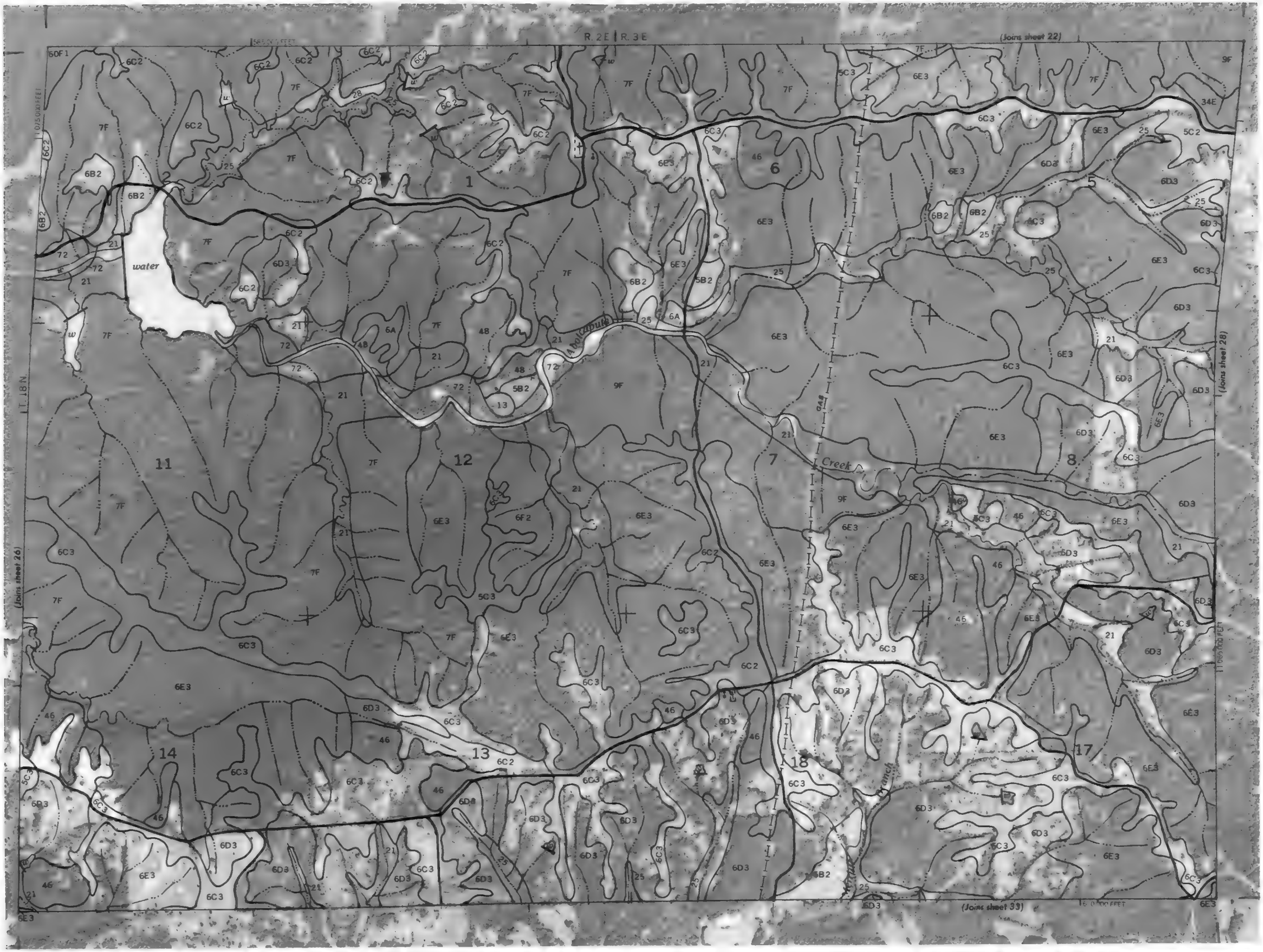
LEFLORE COUNTY

PREVIOUSLY PUBLISHED COUNTY BOUNDARY

560,000 FEET

(Joins sheet 33)

CARROLL COUNTY, MISSISSIPPI — SHEET NUMBER 27



28

N

5,000 Feet

1 Kilometer

Scale 1:20000

(Joins sheet 23)

(Joins sheet 27)

(Joins sheet 34)

(Joins sheet 29)

Gilmore Lake

Pelucia

Ashley

Creek

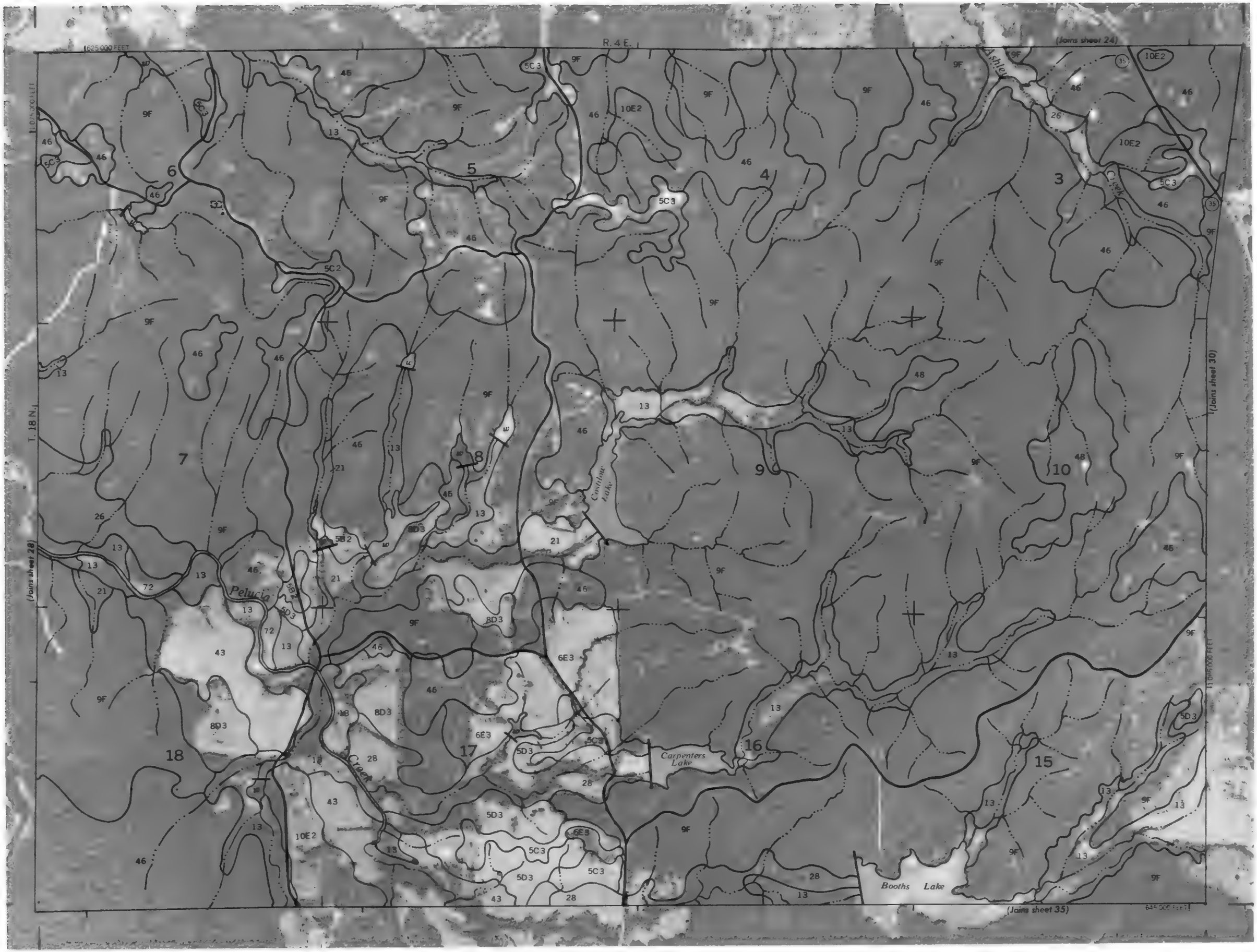
water

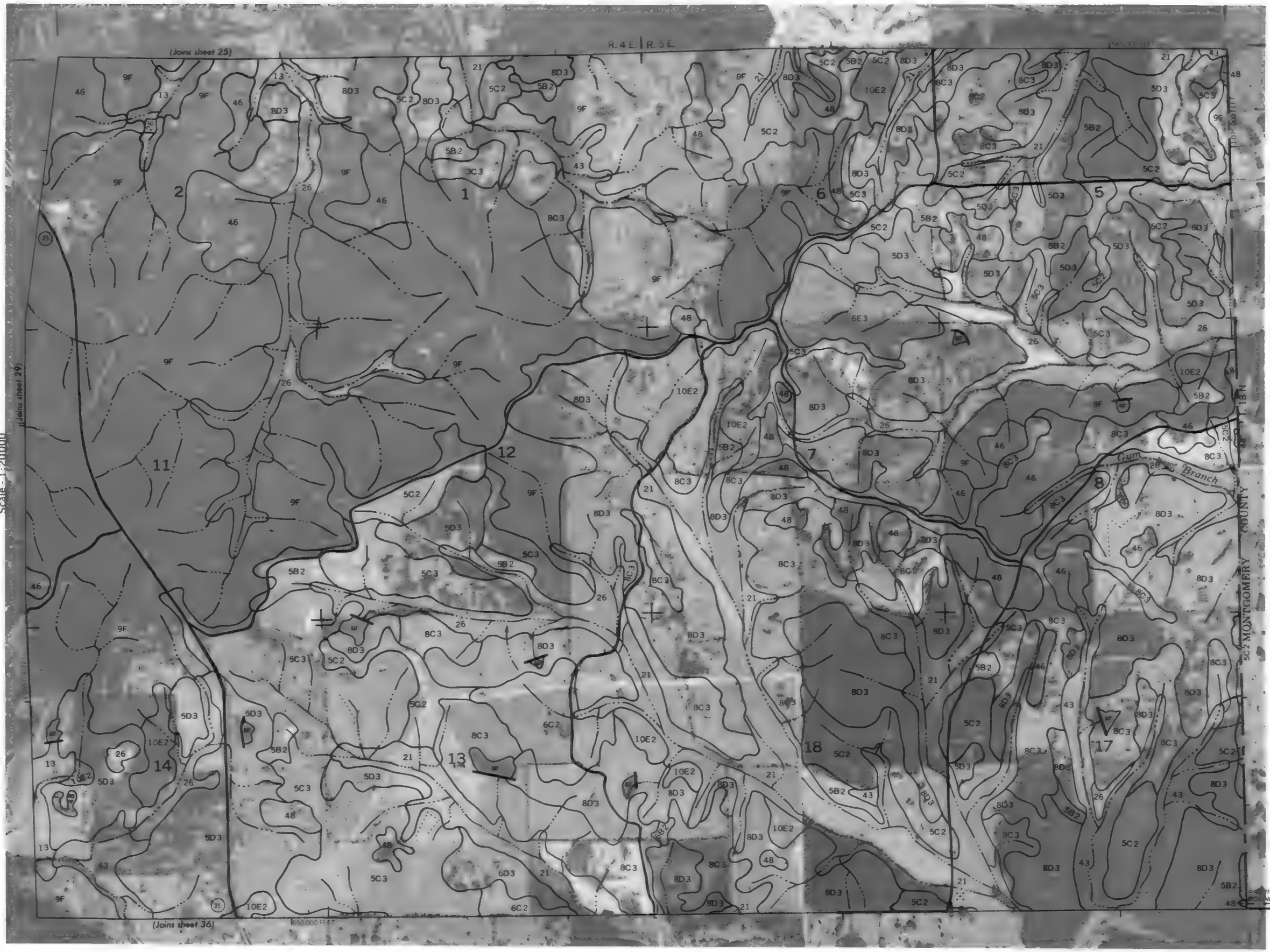
Morgan Lake

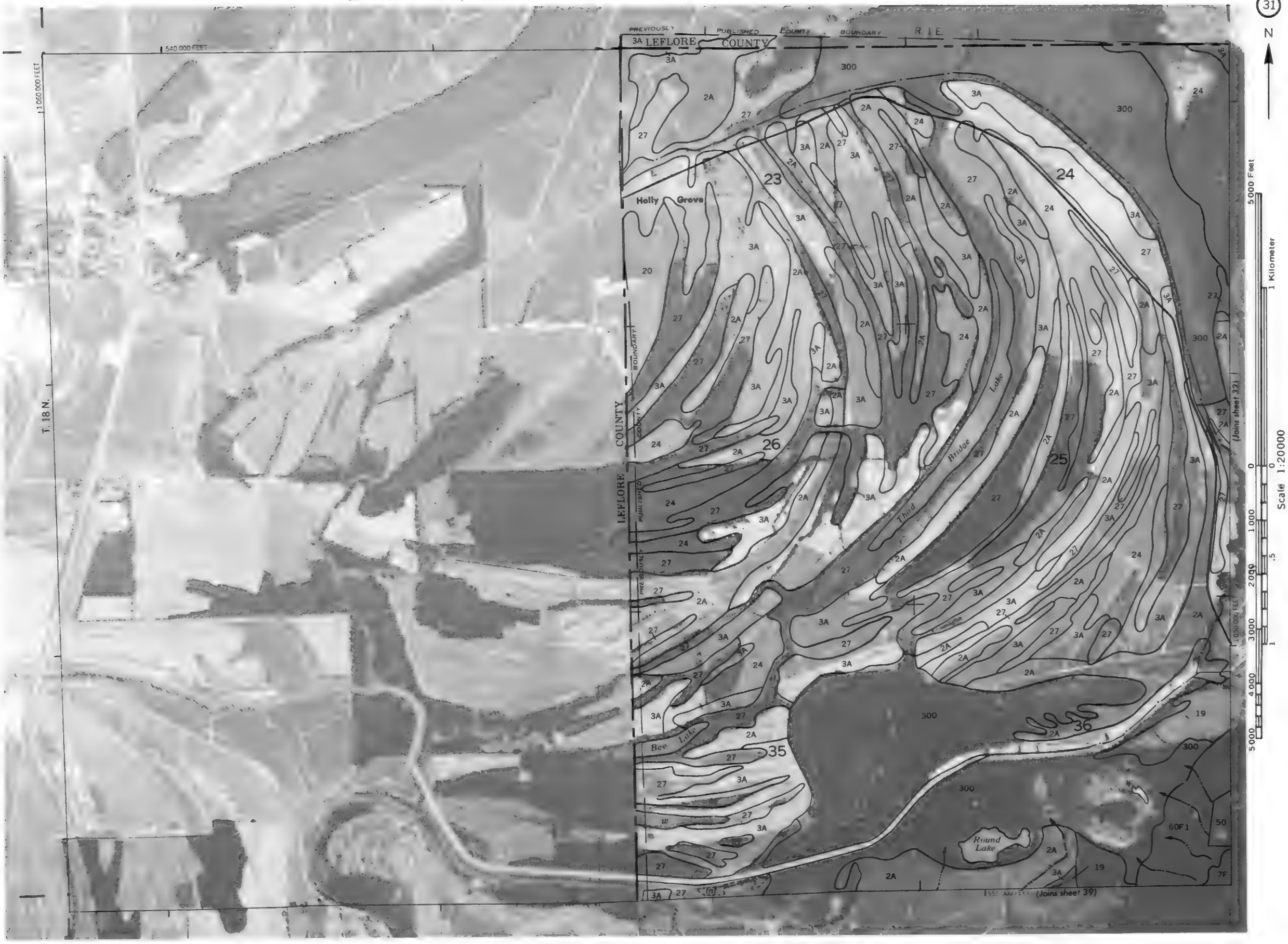
Phillips Lake

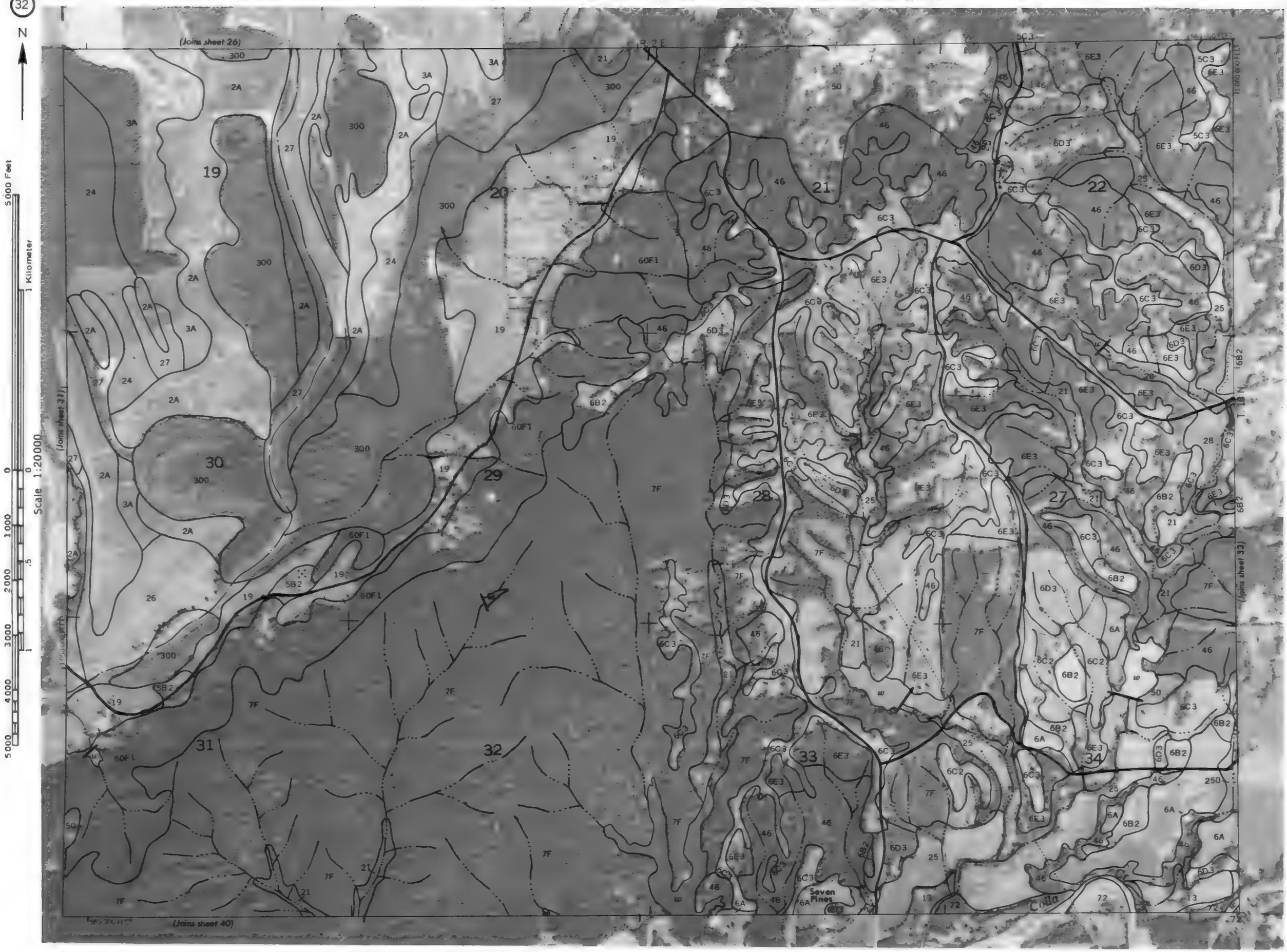
Shelton Lake

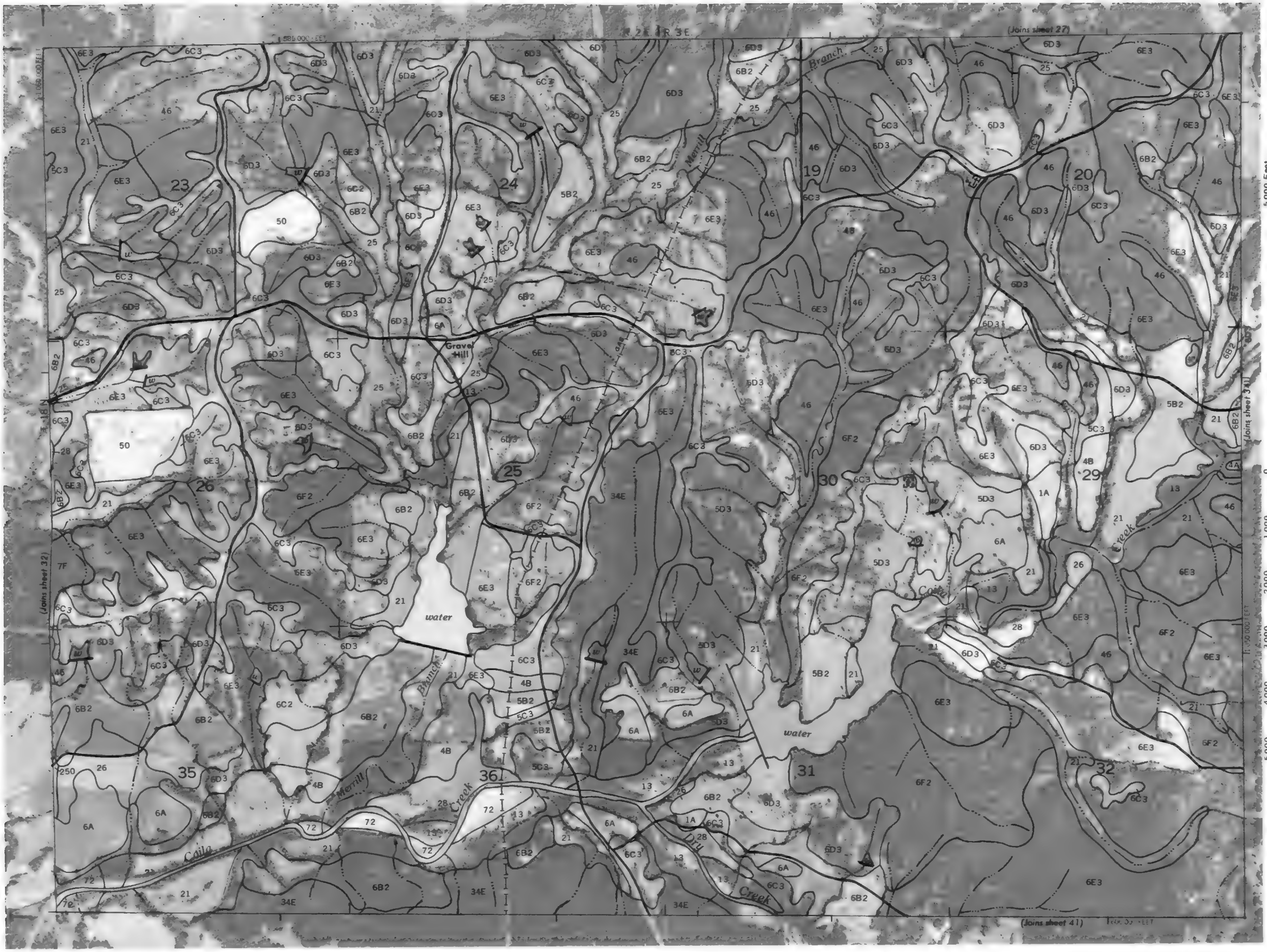
T. 18 N.

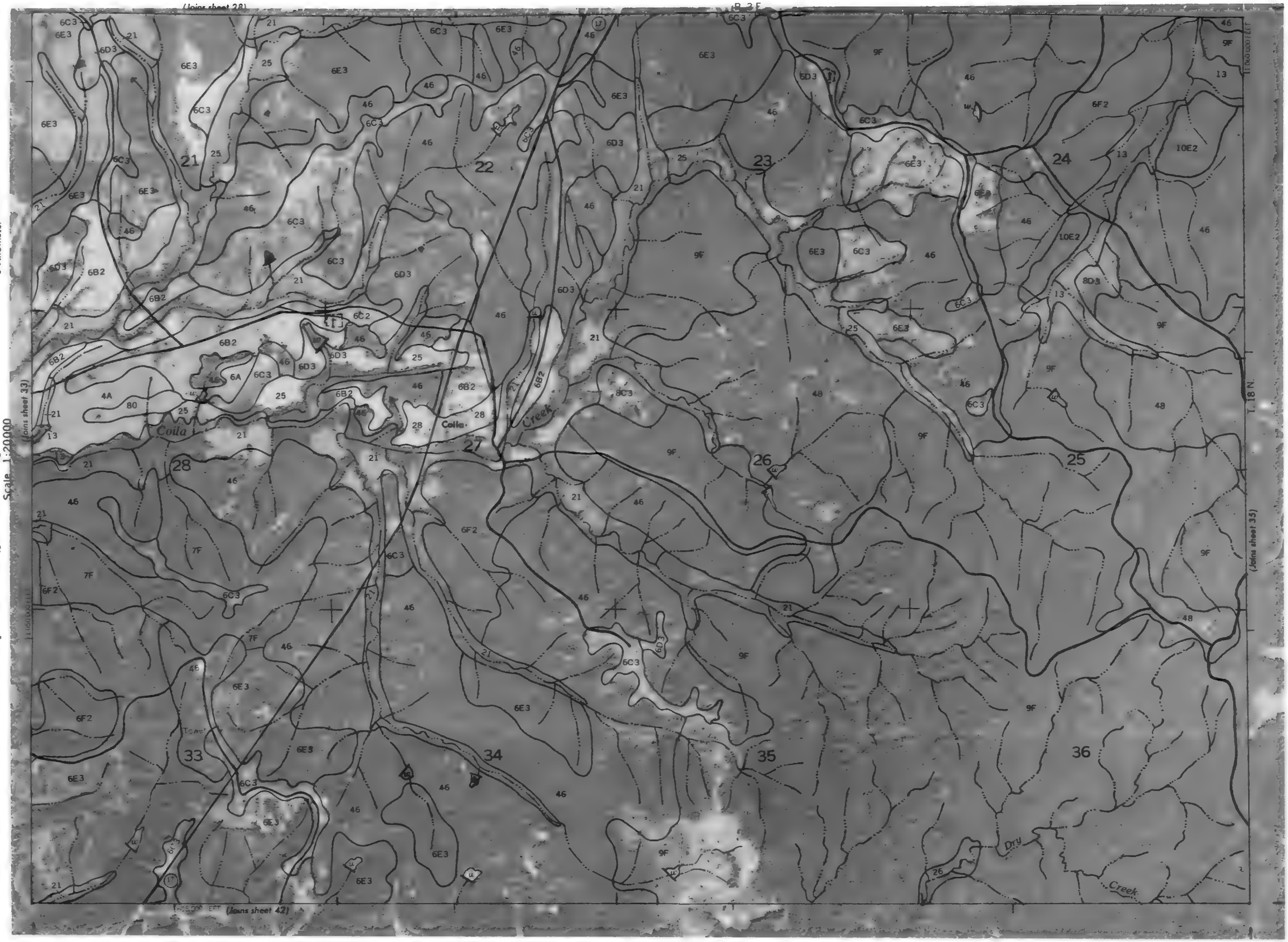

29
N
R. 4 E.
T. 18 N.
1625000 FEET
1075000 FEET
(Joins sheet 24)
(Joins sheet 30)
(Joins sheet 28)
(Joins sheet 35)
Pelucia Creek
Carrolton Lake
Carpenters Lake
Booths Lake
5000 Feet
1 Kilometer
Scale 1:20000

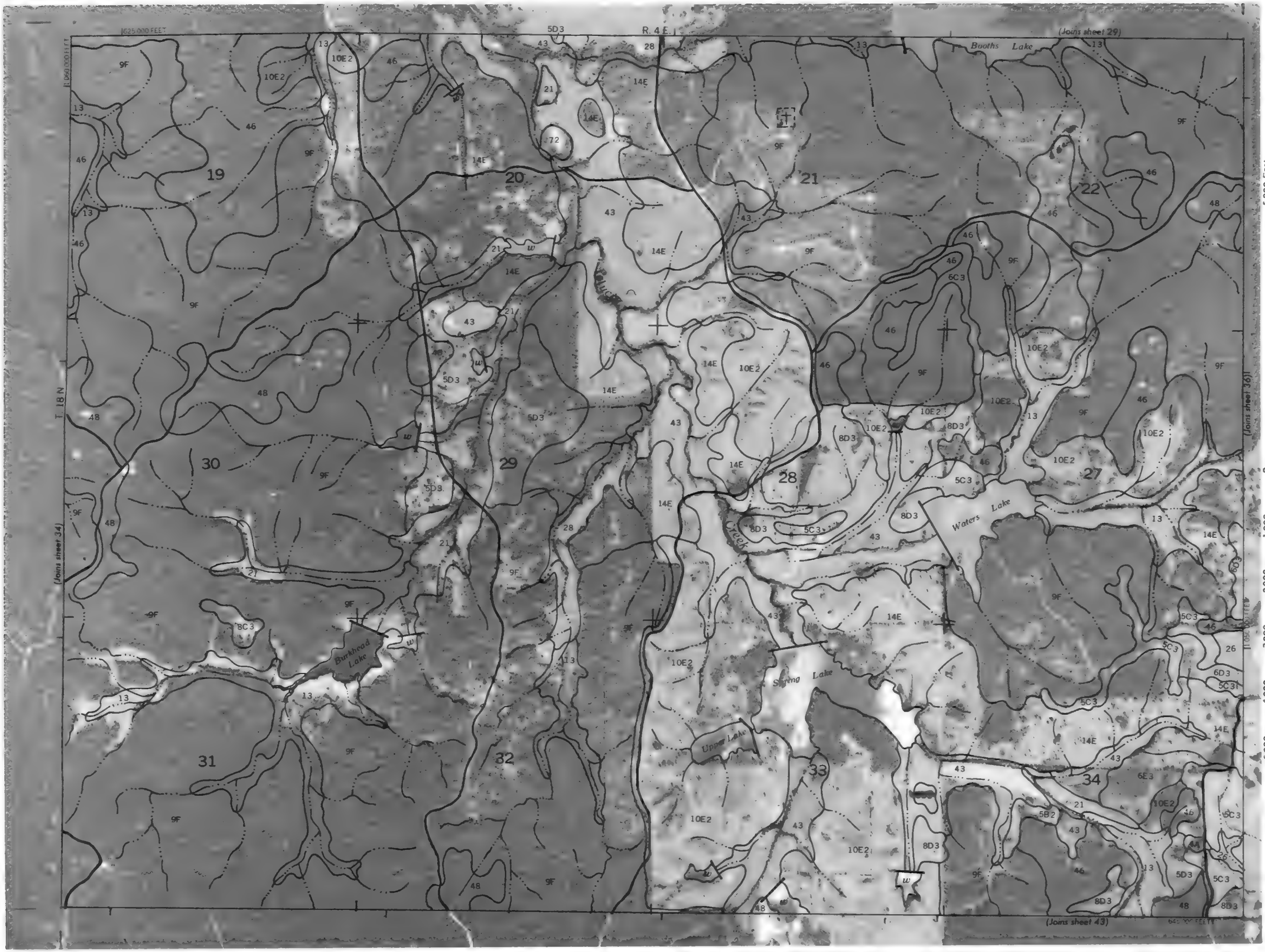

30
N
R. 4 E.
R. 5 E.
(Joins sheet 25)
(Joins sheet 29)
(Joins sheet 36)
5000 Feet
1 Kilometer
Scale 1:20000
650,000 FEET
T. 18 N.
MONTGOMERY COUNTY
PREVIOUS BOUNDARY
Gum Branch
1
2
5
6
7
8
11
12
13
14
17
18

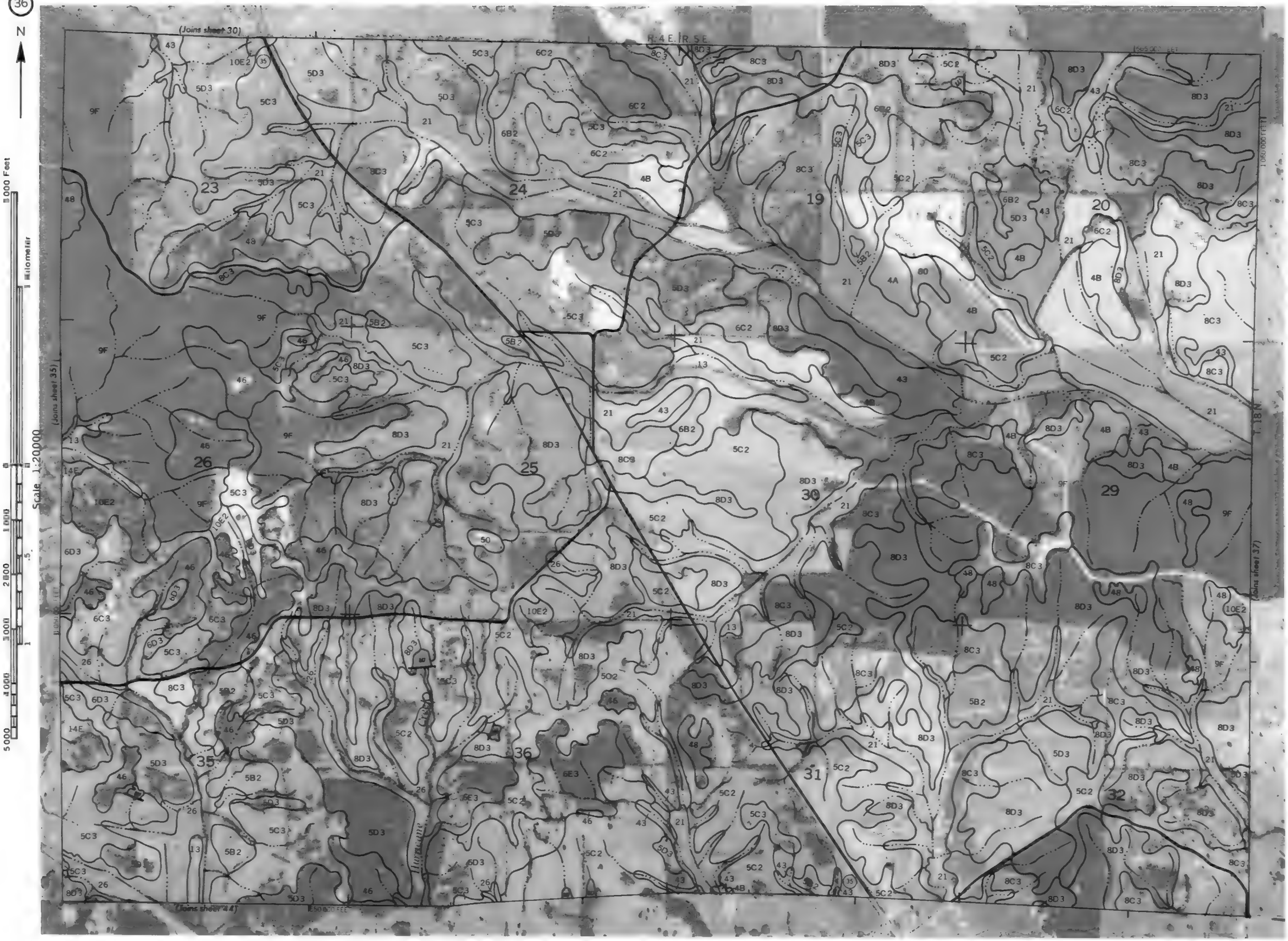

540 000 FEET
1 060 000 FEET
T. 18 N.
PREVIOUSLY PUBLISHED COUNTY BOUNDARY
R. 1 E.
3A LEFLORE COUNTY
LEFLORE COUNTY
PREVIOUSLY PUBLISHED COUNTY BOUNDARY
Holly Grove
Bee Lake
Round Lake
Third Bridge Lake
(Joins sheet 32)
(Joins sheet 39)
N
5000 Feet
1 Kilometer
Scale 1:20000


32
N
(Joins sheet 26)
R 2 E
(Joins sheet 31)
(Joins sheet 40)
(Joins sheet 33)
Seven Pines
Cr
5,000 Feet
1 Kilometer
Scale 1:20000
0
1000
2000
3000
4000
5000
.5
1
19
20
21
22
29
30
31
32
33
34
27
28
300
2A
3A
24
27
19
21
50
46
6C3
6E3
6D3
60F1
6B2
5B2
7F
6A
6C2
25
6B2


33
N
(Joins sheet 27)
(Joins sheet 32)
(Joins sheet 34)
(Joins sheet 41)
5000 Feet
1 Kilometer
Scale 1:20000
Merrill Branch
Gravel Hill
Merrill Creek
Dry Creek
Coila Creek
water
19
20
23
24
25
26
29
30
31
32
35
36


N
(Joins sheet 28)
R. 3 E.
T. 18 N.
5,000 Feet
1 Kilometer
Scale 1:20000
(Joins sheet 33)
Coila
Coila
Creek
Town
Dry
Creek
(Joins sheet 42)
(Joins sheet 35)
21
22
23
24
25
26
27
28
33
34
35
36


35
N
R. 4 E.
T. 18 N.
(Joins sheet 29)
(Joins sheet 34)
(Joins sheet 36)
(Joins sheet 43)
Booths Lake
Waters Lake
Lake
Creek
Burkhead Lake
Spring Lake
Upper Lake
19
20
21
22
28
29
30
31
32
33
34
27
5000 Feet
1 Kilometer
Scale 1:20000


36
N
(Joins sheet 30)
R. 4 E.
R. 5 E.
T. 18 N.
23
24
19
20
26
25
30
29
35
36
31
32
(Joins sheet 35)
(Joins sheet 37)
(Joins sheet 44)
Scale 1:20000
1000 Feet
1 Kilometer
Hurricane Creek

N

MONTGOMERY COUNTY

R. 5 E.

T. 18 N.

1 060 000 FEET

Hays Creek

GULF CENTRAL ILLINOIS

Wood

Carroll

(Joins sheet 36)

(Joins sheet 38)

(Joins sheet 45)

5000 Feet

1 Kilometer

Scale 1:20000

38

N

Scale 1:20000

5000 Feet

1 Kilometer

R. 6 E.

T. 18 N.

MONTGOMERY COUNTY

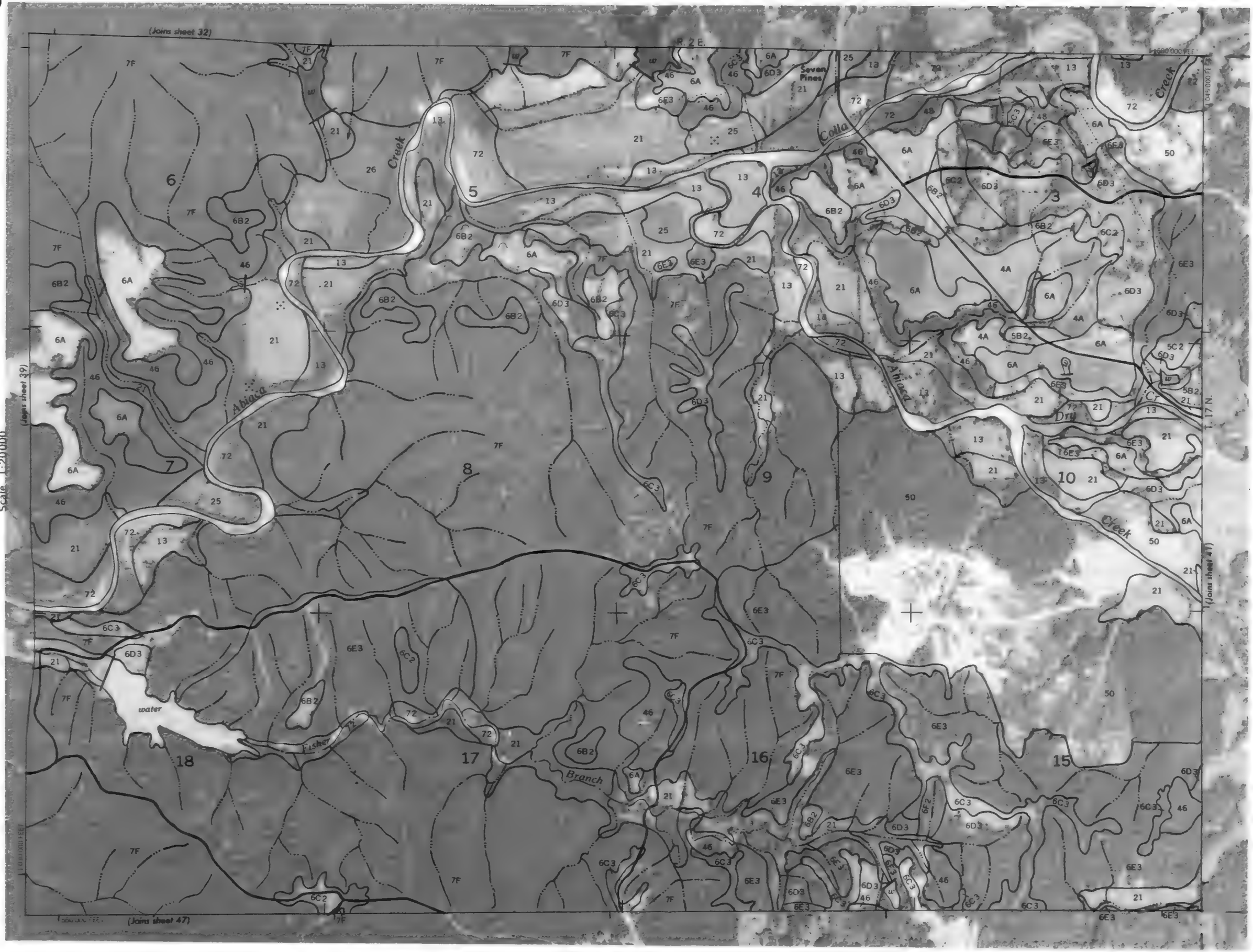
MONTGOMERY COUNTY

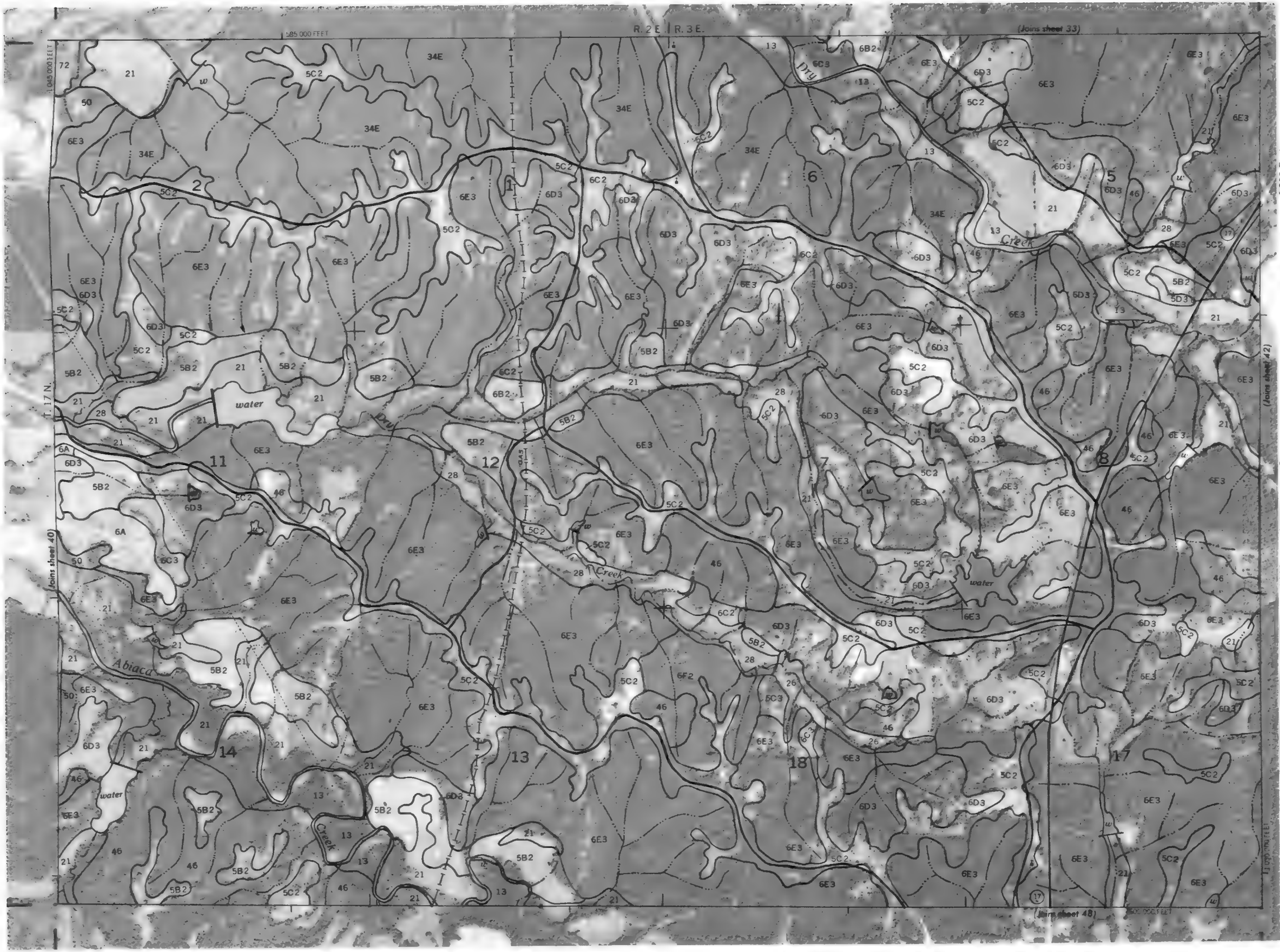
(Joins sheet 37)

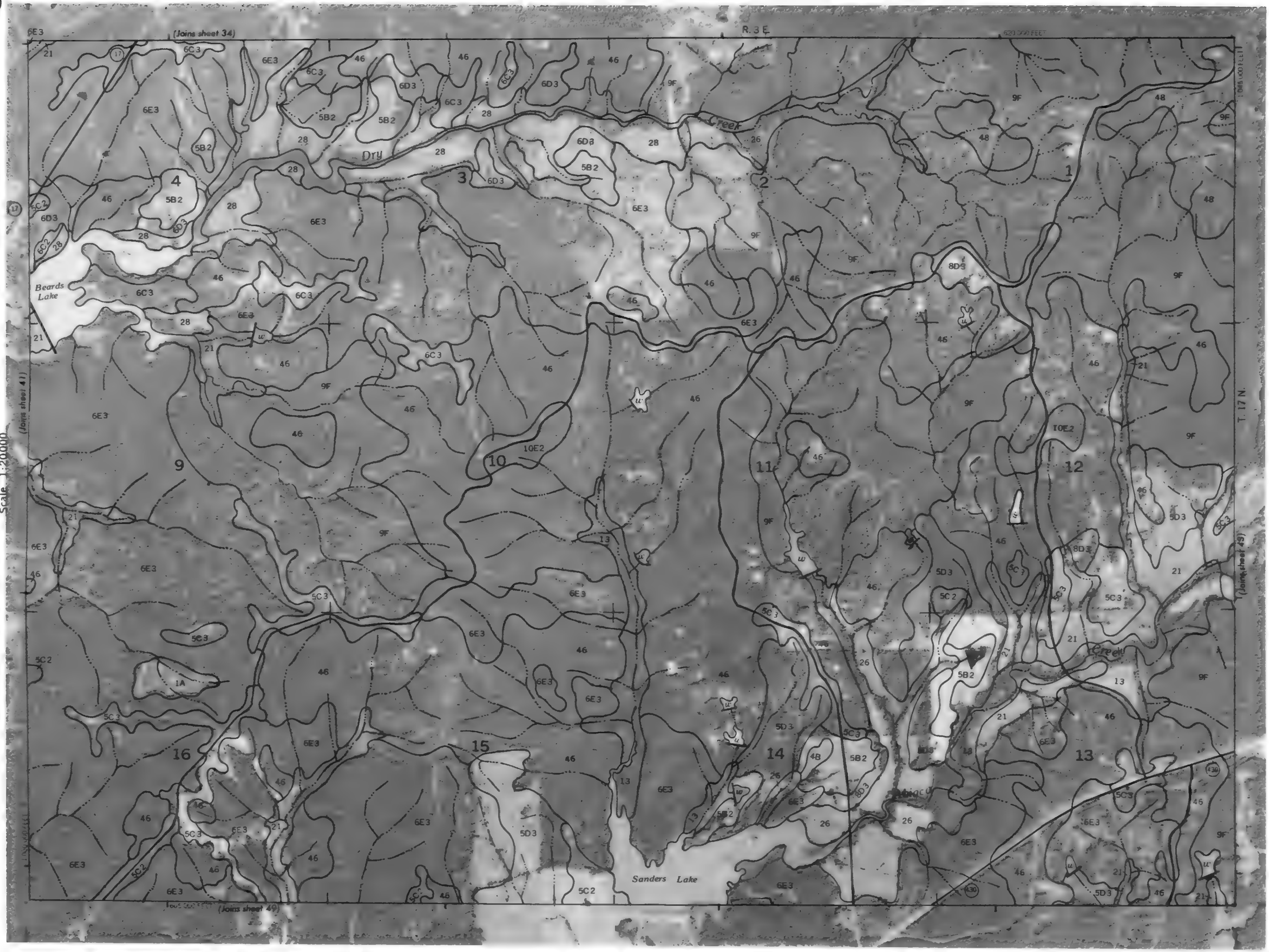
(Joins sheet 46)

water

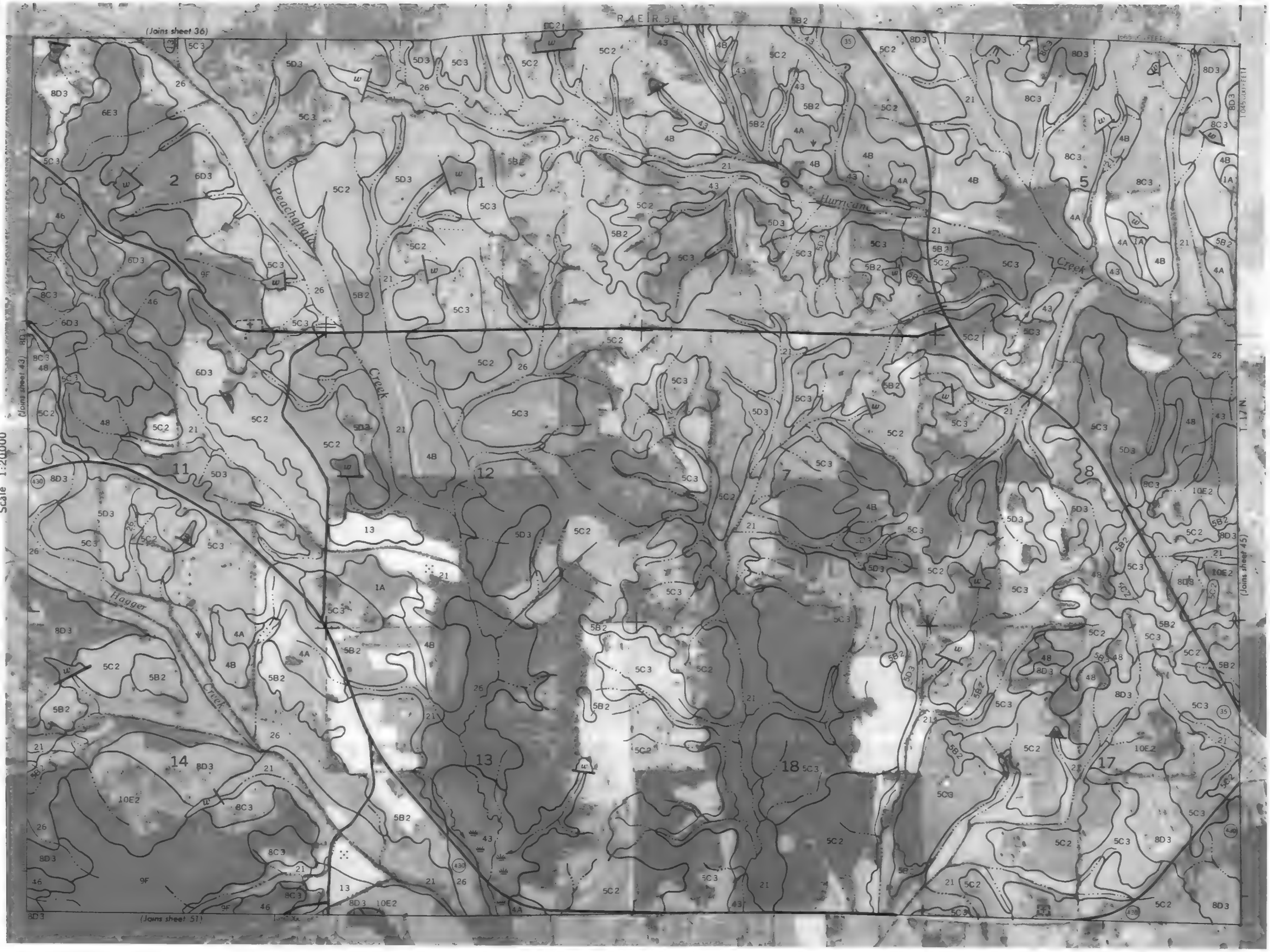

39
N
R. 1 E.
(Joins sheet 31)
T. 17 N.
1 540 000 FEET
1 045 000 FEET
LEFLORE COUNTY
HOLMES COUNTY
PREVIOUS BDY
Oklahoma
Pine Bluff
Fisher
Creek
Abiaca
(Joins inset A, sheet 47)
(Joins sheet 40)
5,000 Feet
1 Kilometer
Scale 1:20000


(40)
N
(Joins sheet 32)
R. 2 E.
T. 17 N.
Seven Pines
Colla
Creek
Abiaca
Dry
Fisher
Branch
water
(Joins sheet 39)
(Joins sheet 41)
(Joins sheet 47)
5000 Feet
1 Kilometer
Scale 1:20000


585 000 FEET
R. 2 E.
R. 3 E.
(Joins sheet 33)
T. 17 N.
1 045 000 FEET
(Joins sheet 40)
(Joins sheet 42)
(Joins sheet 48)
500 000 FEET
Dry
Creek
Abiaca
water
N
5000 Feet
1 Kilometer
Scale 1:20000


42
N
5,000 Feet
1 Kilometer
Scale 1:20000
6E3
(Joins sheet 34)
R. 3 E.
T. 17 N.
Dry Creek
Beards Lake
Sanders Lake
(Joins sheet 41)
(Joins sheet 49)
(Joins sheet 43)
1
2
3
4
9
10
11
12
13
14
15
16


1 625 000 FEET
R. 4 E.
(Joins sheet 35)
1 045 000 FEET
T. 17 N.
(Joins sheet 42)
(Joins sheet 44)
46 (Joins sheet 50)
1 035 000 FEET
645 000 FEET
Abiaca Creek
Hagger Creek
Murdock Creek
5 000 Feet
1 Kilometer
Scale 1:20000


44
N
R.4 E.
R.5 E.
T.17 N.
(Joins sheet 36)
(Joins sheet 43)
(Joins sheet 45)
(Joins sheet 51)
Peachahala Creek
Hurricane Creek
Hagger Creek
5000 Feet
1 Kilometer
Scale 1:20000


R. 5 E.
T. 17 N.
1070 000 FEET
1045 000 FEET
(Joins sheet 37)
(Joins sheet 44)
(Joins sheet 46)
(Joins sheet 52)
Hurricane Creek
Dry Creek
Hays Creek
GULF, CENTRAL
ILLINOIS
Vaiden
4
3
2
1
9
10
11
12
16
15
14
13
45
N
5000 Feet
1 Kilometer
Scale 1:20000

N

(Joins sheet 38)

R. 6 E.

705 000 FEET

T. 17 N.

MONTGOMERY COUNTY

(Joins sheet 45)

(Joins sheet 53)

690 000 FEET

5000 Feet

1 Kilometer

Scale 1:20000

0 .5 1

0 1000 2000 3000 4000 5000

water

RIVER

BLACK

BIG

R. 2 E.

(Joins inset A,) T. 17 N.

(Joins sheet 40)

(Joins sheet 48)

HOLMES COUNTY

Adair

INSET A

R. 1 E.

(Joins sheet 39)

(Joins upper left)

HOLMES COUNTY

T. 17 N.

4000 AND 5000-FOOT GRID TICKS

INSET B

R. 3 E.

(Joins sheet 48)

(sh 54)

T. 16 N.

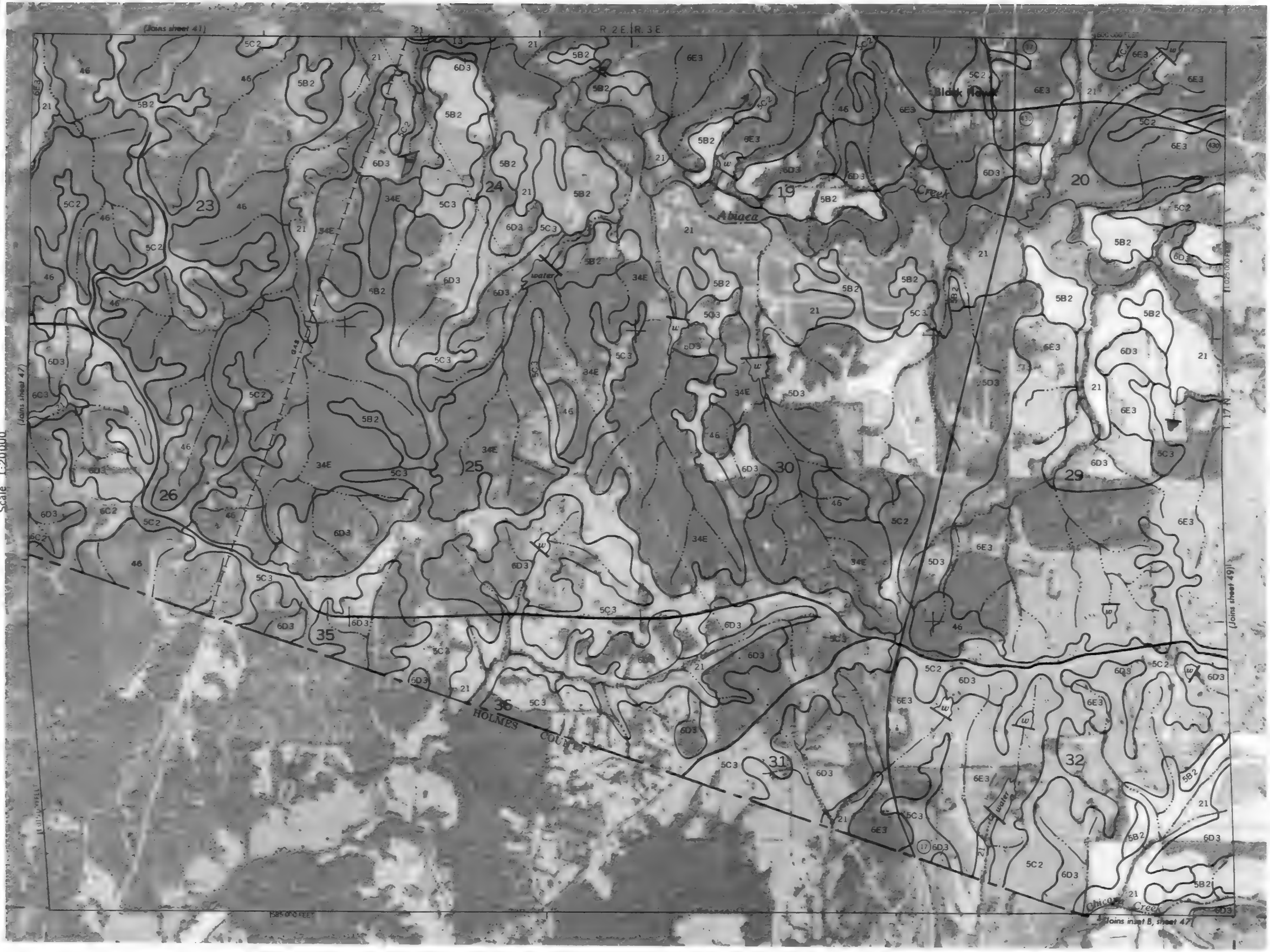
2000 AND 3000-FOOT GRID TICKS

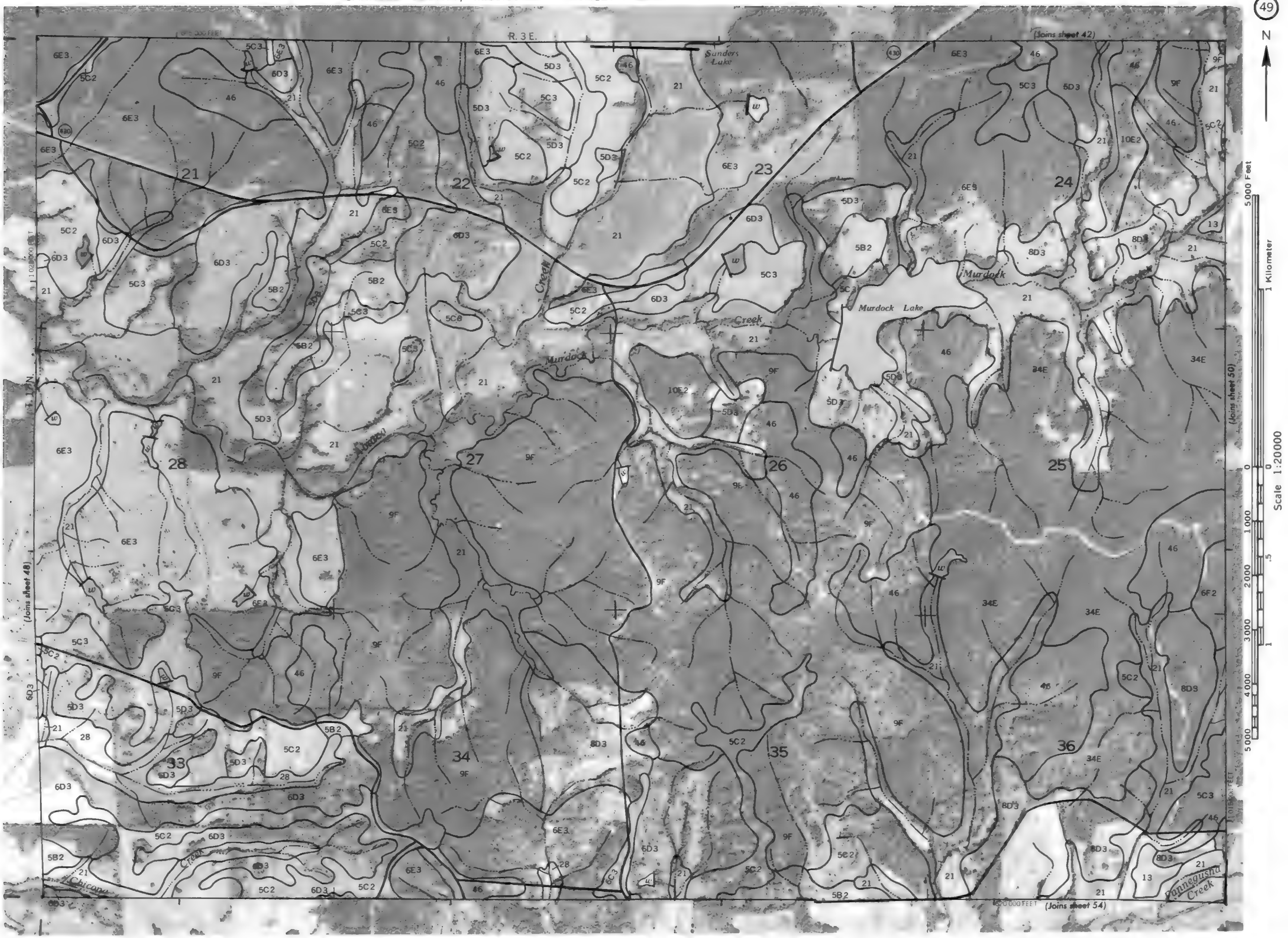
N

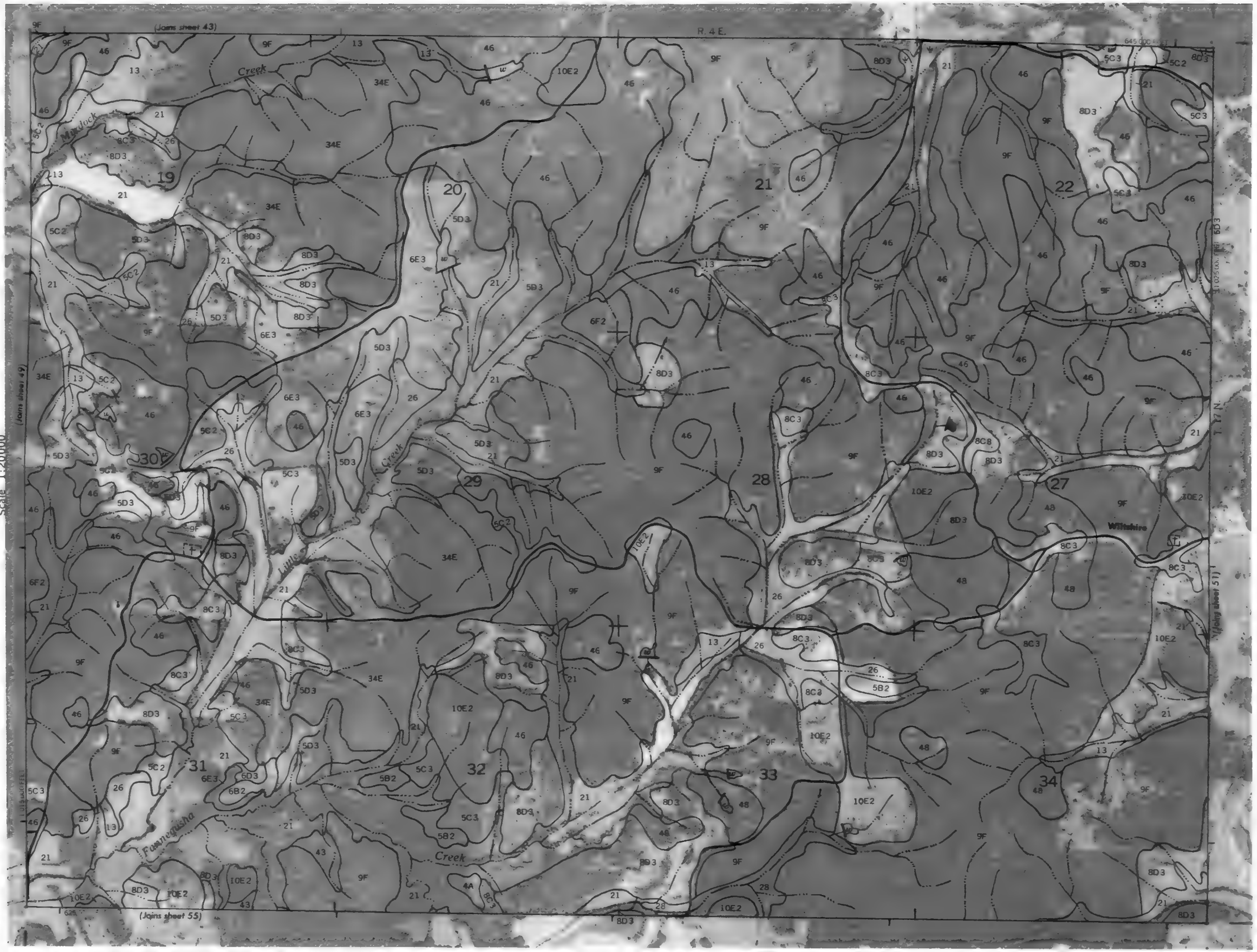
5,000 Feet

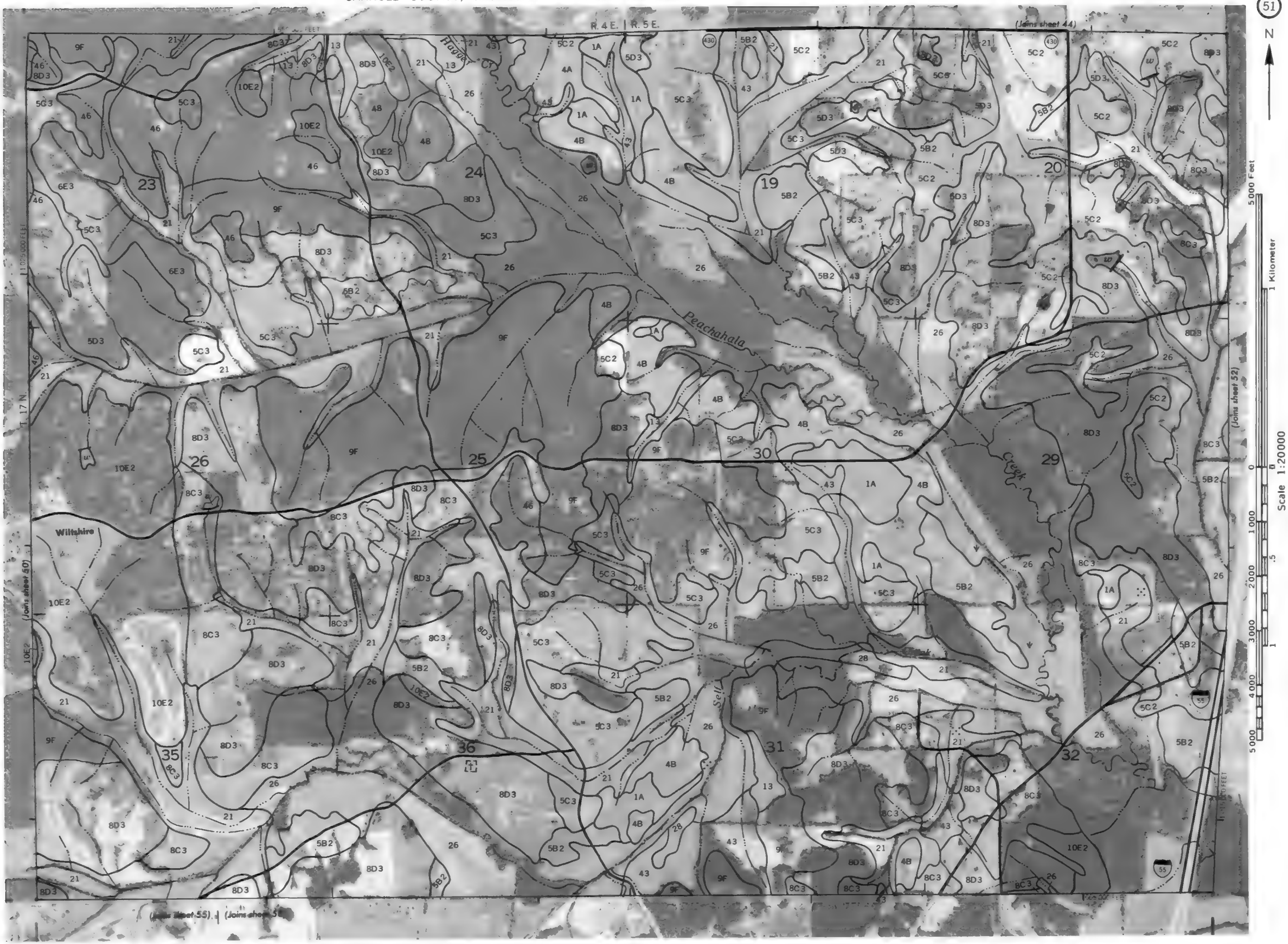
1 Kilometer

Scale 1:20000


48
N
(Joins sheet 41)
R 2 E.
R. 3 E.
Black Bayou
Abiaca
Creek
water
HOLMES COUNTY
Chicopa
Creek
(Joins inset B, sheet 47)
(Joins sheet 49)
(Joins sheet 47)
1 Kilometer
5,000 Feet
Scale 1:20000
23
24
25
26
35
36
19
20
29
30
31
32
5C2
5B2
6D3
6E3
5C3
5D3
34E
46
21


49
N
R. 3 E.
(Joins sheet 42)
(Joins sheet 48)
(Joins sheet 50)
(Joins sheet 54)
T. 17 N.
Sanders Lake
Murdock Lake
Murdock
Creek
Murdock Creek
Chicopa Creek
Pannegusha Creek
21
22
23
24
25
26
27
28
33
34
35
36
5000 Feet
1 Kilometer
Scale 1:20000
0
1000
2000
3000
4000
5000
0
.5
1


50
N
(Joins sheet 43)
R. 4 E.
645 000 FEET
1 025 000 FEET
T. 17 N.
(Joins sheet 49)
(Joins sheet 51)
(Joins sheet 55)
Creek
Murdock
Little
Fannegusha
Creek
Creek
Wiltshire
19
20
21
22
30
29
28
27
31
32
33
34
5000 Feet
1 Kilometer
Scale 1:20000


R.4E. | R.5E.
(Joins sheet 44)
T. 17 N.
(Joins sheet 50)
(Joins sheet 52)
(Joins sheet 55)
(Joins sheet 56)
Haggar Cr.
Peachahala
Creek
Sell
Creek
Wiltshire
19
20
23
24
25
26
29
30
31
32
35
36
5000 Feet
1 Kilometer
Scale 1:20000
N
51

CARROLL COUNTY, MISSISSIPPI — SHEET NUMBER 52

52

N

(Joins sheet 45)

R. 5 E.

Vaiden

Hays Creek

Illinois Central

Dry Creek

Prochahoma Creek

T. 17 N.

(Joins sheet 53)

(Joins sh 56) | (Joins sheet 57)

(Joins sheet 57) | inset, sh 21

5000 Feet

1 Kilometer

Scale - 1:20000

0 1000 2000 3000 4000 5000

1 .5 0

690 000 FEET
R. 6 E.
(Joins sheet 46)
1 025 000 FEET
T. 17 N.
(Joins sheet 52)
(Joins inset, sheet 21)
ATTALA CO
ATTALA COUNTY
MONTGOMERY COUNTY
KILLEN
BLACK
Hays
Creek
19
20
21
22
23
26
27
28
29
30
31
32
33
34
35
N
5,000 Feet
1 Kilometer
Scale - 1:20000

54

N

5,000 Feet

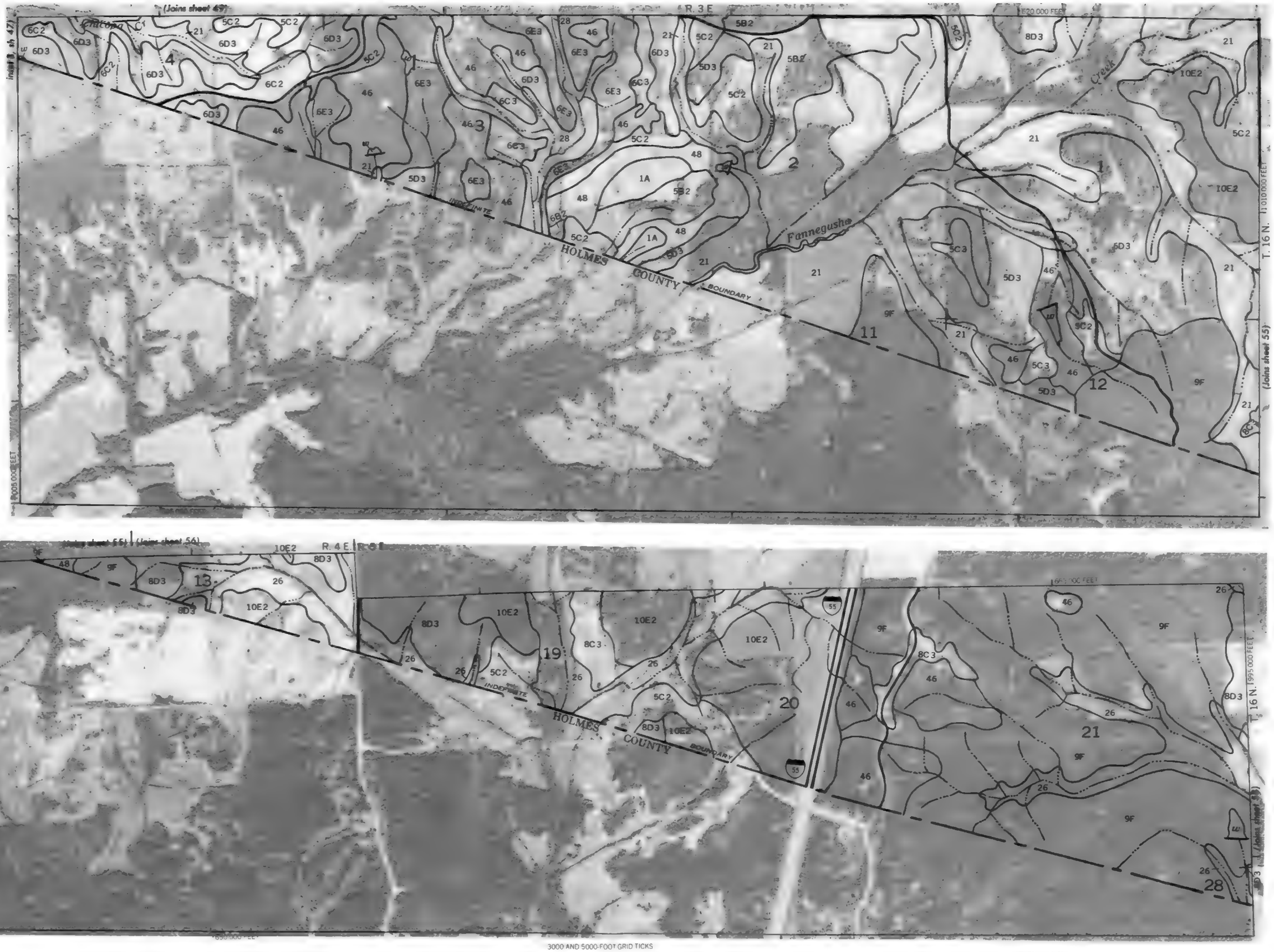
1 Kilometer

0

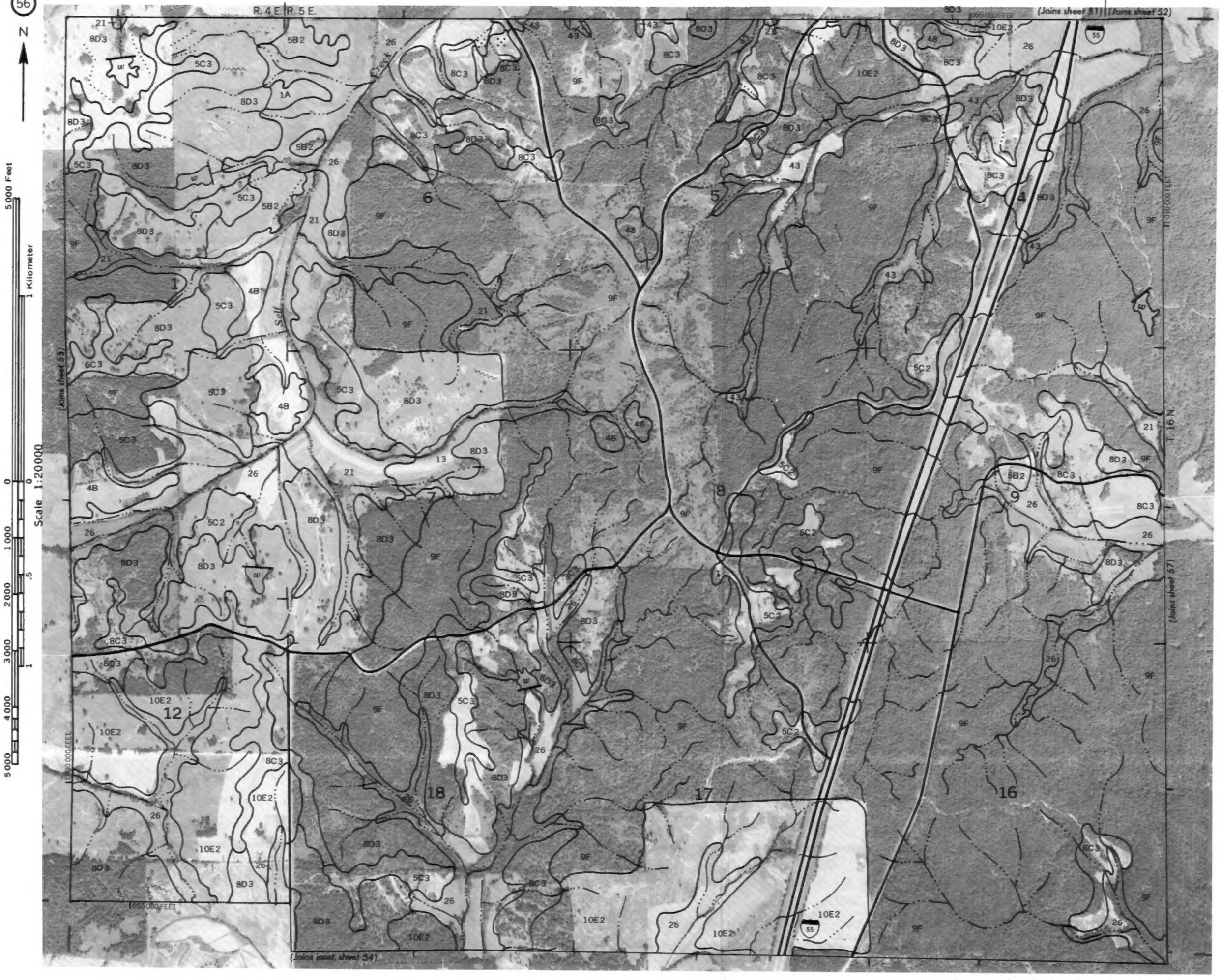
Scale 1:20000

0 1,000 2,000 3,000 4,000 5,000

.5 0 1




55
N
R 4 E.
T. 16 N.
(Joins sheet 30)
(Joins sheet 31)
(Joins sheet 54)
(Joins sheet 56)
625000 FEET
610000 FEET
INDEFINITE
HOLMES
COUNTY
BOUNDARY
5000 Feet
1 Kilometer
Scale 1:20000
0 .5 0 1
1000 2000 3000 4000 5000
FEET


N
R. 4 E.
R. 5 E.
T. 16 N.
Scale 1:20000
5000 Feet
1 Kilometer
(Joins sheet 55)
(Joins sheet 51)
(Joins sheet 52)
(Joins sheet 57)
(Joins inset sheet 54)
660000 FEET
1650000 FEET
Creek
Self
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
1A
5B2
5C3
5C2
8C3
8D3
9F
10E2
26
43
48
55


57
N
670 000 FEET
R. 5 E.
R. 6 E.
(Joins sheet 52)
T. 16 N.
(Joins sheet 56)
(Joins inset, sheet 21)
685 000 FEET
(Joins sheet 58)
Peachahala Creek
Dry Creek
Beatty
Smiths
Hudson Creek
BIG BLACK RIVER
ATTALA COUNTY
GULF
CENTRAL
ILLINOIS
5000 Feet
1 Kilometer
Scale 1:20000

58

N

(Joins sheet 57)

(Joins inset, sheet 54)

R. 5 E.

685 000 FEET

695 000 FEET

T. 16 N.

T.

620 000 FEET

5000 Feet

1 Kilometer

Scale - 1:20000

HOLMES COUNTY

BOUNDARY

ILLINOIS CENTRAL GULF

Hudson Creek

BLACK ATTALA COUNTY RIVER

BIG

INDEPENDENCE

22 23 24 27 26 25 17

8C3 8D3 10E2 5B2 4A 4B 1A 5C2 9F 43 22 21 26